

The SGRUD Thesis

SGRUD is Growing Rapidly Until Distinction.

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Abstract

Abstract.

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Appendix

Module: bin

bin

- **bin**: Object

@sgrud/bin - The SGRUD CLI.

Description

@sgrud/bin - The SGRUD CLI

Usage

\$ sgrud <command> [options]

Available Commands

construct	Builds a SGRUD-based project using `microbundle`
kickstart	Kickstarts a SGRUD-based project using `simple-git`
postbuild	Replicates exported package metadata for SGRUD-based projects
runtimeify	Creates ESM or UMD bundles for ES6 modules using `microbundle`
universal	Runs SGRUD in universal (SSR) mode using `puppeteer`

For more info, run any command with the `--help` flag

```
$ sgrud construct --help
$ sgrud kickstart --help
```

Options

-v, --version	Displays current version
-h, --help	Displays this message

Defined in packages/bin/index.ts:34

bin.construct

construct

► **construct**(options?): Promise<void>

Constructs a SGRUD-based project using microbundle.

Description

Constructs a SGRUD-based project using `microbundle`

Usage

\$ sgrud construct [...modules] [options]

Options

--compress	Compress/minify build output (default true)
--format	Build specified formats (default commonjs,modern,umd)
--prefix	Use an alternative working directory (default ./.)
-h, --help	Displays this message

Examples

```
$ sgrud construct # Run with default options
```



```
$ sgrud construct ./project/module # Build ./project/module
$ sgrud construct ./module --format umd # Build ./module as umd
```

Example

Run with default options:

```
require('@sgrud/bin');

sgrud.bin.construct();
```

Example

Construct ./project/module:

```
require('@sgrud/bin');

sgrud.bin.construct({
  modules: ['./project/module']
});
```

Example

Construct ./module as umd:

```
require('@sgrud/bin');

sgrud.bin.construct({
  modules: ['./module'],
  format: 'umd'
});
```

Parameters

Name	Type	Description
options	Object	Options object.
options.compress?	boolean	Compress/minify construct output. Default Value true
options.format?	string	Construct specified formats. Default Value 'commonjs,modern,umd'
options.modules?	string[]	Modules to construct . Default Value package.json#sgrud.construct
options.prefix?	string	Use an alternative working directory. Default Value './'

Returns

Promise<void>

Execution promise.

Defined in

packages/bin/src/construct.ts:77

bin.kickstart

kickstart

► **kickstart**(options?): Promise<void>

Kickstarts a SGRUD-based project using simple-git.

Description

Kickstarts a SGRUD-based project using `simple-git`

Usage

```
$ sgrud kickstart [library] [options]
```

Options

```
--prefix    Use an alternative working directory (default ./)
-h, --help  Displays this message
```

Examples

```
$ sgrud kickstart # Run with default options
$ sgrud kickstart preact --prefix ./module # Kickstart preact in ./module
```

Example

Run with default options:

```
require('@sgrud/bin');

sgrud.bin.kickstart();
```

Example

Kickstart preact in ./module:

```
require('@sgrud/bin');

sgrud.bin.kickstart({
  prefix: './module',
  library: 'preact'
});
```

Parameters

Name	Type	Description
options	Object	Options object.
options.library?	string	Library which to base upon. Default Value 'sgrud'
options.prefix?	string	Use an alternative working directory. Default Value './'

Returns

Promise<void>

Execution promise.

Defined in

packages/bin/src/kickstart.ts:59

bin.postbuild

postbuild

► **postbuild**(options?): Promise<void>

Replicates exported package metadata for SGRUD-based projects.

Description

Replicates exported package metadata for SGRUD-based projects

Usage

```
$ sgrud postbuild [...modules] [options]
```

Options

```
--prefix      Use an alternative working directory (default ./)
-h, --help    Displays this message
```

Examples

```
$ sgrud postbuild # Run with default options
$ sgrud postbuild ./project/module # Postbuild ./project/module
$ sgrud postbuild --prefix ./module # Run in ./module
```

Example

Run with default options:

```
require('@sgrud/bin');

sgrud.bin.postbuild();
```

Example

Postbuild ./project/module:

```
require('@sgrud/bin');

sgrud.bin.postbuild({
  modules: ['./project/module']
});
```

Example

Run in ./module:

```
require('@sgrud/bin');

sgrud.bin.postbuild({
  prefix: './module'
});
```

Parameters

Name	Type	Description
options	Object	Options object.
options.modules?	string[]	Modules to postbuild . Default Value
options.prefix?	string	package.json#sgrud.postbuild Use an alternative working directory. Default Value './'

Returns

Promise<void>

Execution promise.

Defined in

packages/bin/src/postbuild.ts:70

bin.runtimify

runtimify

► **runtimify**(options?): Promise<void>

Creates ESM or UMD bundles for node modules using microbundle.

Description

Creates ESM or UMD bundles for node modules using `microbundle`

Usage

```
$ sgrud runtimize [...modules] [options]
```

Options

```
--format      Runtimize bundle format (umd or esm) (default umd)
--output       Output file in module root (default runtimize.[format].js)
--prefix       Use an alternative working directory (default ./)
-h, --help     Displays this message
```

Examples

```
$ sgrud runtimize # Run with default options
$ sgrud runtimize @microsoft/fast # Runtimize `@microsoft/fast`
```

Example

Run with default options:

```
require('@sgrud/bin');

sgrud.bin.runtimize();
```

Example

Runtimize @microsoft/fast:

```
require('@sgrud/bin');

sgrud.bin.runtimify({
  modules: ['@microsoft/fast']
});
```

Parameters

Name	Type	Description
options	Object	Options object.
options.format?	string	Runtimify bundle format (umd or esm). Default Value 'umd'
options.modules?	string[]	Modules to runtimify . Default Value
options.output?	string	package.json#sgrud.runtimify Output file in module root. Default Value
options.prefix?	string	'runtimify.[format].js' Use an alternative working directory. Default Value './'

Returns

Promise<void>

Execution promise.

Defined in

packages/bin/src/runtimify.ts:63

bin.universal

universal

► **universal**(options?): Promise<void>

Runs SGRUD in **universal** (SSR) mode using puppeteer.

Description

Runs SGRUD in universal (SSR) mode using `puppeteer`

Usage

\$ sgrud universal [entry] [options]

Options

```
--chrome      Chrome executable path (default /usr/bin/chromium-browser)
--prefix       Use an alternative working directory (default ./)
-H, --host     Host/IP to bind to (default 127.0.0.1)
-p, --port     Port to bind to (default 4000)
-h, --help     Displays this message
```

Examples

```
$ sgrud universal # Run with default options
$ sgrud universal --host 0.0.0.0 # Listen on all IPs
$ sgrud universal -H 192.168.0.10 -p 4040 # Listen on 192.168.0.10:4040
```

Example

Run with default options:

```
require('@sgrud/bin');

sgrud.bin.universal();
```

Example

Listen on all IPs:

```
require('@sgrud/bin');

sgrud.bin.universal({
  host: '0.0.0.0'
});
```

Example

Listen on 192.168.0.10:4040:

```
require('@sgrud/bin');

sgrud.bin.universal({
  host: '192.168.0.10',
  port: '4040'
});
```

Parameters

Name	Type	Description
options	Object	Options object.
options.chrome?	string	Chrome executable path. Default Value '/usr/bin/chromium-browser'
options.entry?	string	HTML document (relative to prefix). Default Value 'index.html'
options.host?	string	Host/IP to bind to. Default Value '127.0.0.1'
options.port?	string	Port to bind to. Default Value '4000'
options.prefix?	string	Use an alternative working directory. Default Value './'

Returns

Promise<void>

Execution promise.

Defined in packages/bin/src/universal.ts:76

Module: bus

bus

• **bus**: Object

@sgrud/bus - The SGRUD Software Bus.

The functions and classes found within this module are intended to ease the internal communication of applications building upon the SGRUD client libraries. By establishing busses between different modules of an application or between an application and plugins extending it, loose coupling of data transferral and functionality can be achieved. This module includes a standalone JavaScript bundle which will be used to instantiate a Worker, which is used as central hub for data exchange.

Defined in packages/bus/index.ts:18

bus.BusHandle

BusHandle

T **BusHandle**: `\${string}.\${string}.\${string}`

The **BusHandle** is a string literal helper type which enforces any assigned value to contain at least three dots. It represents a type constraint which should be thought of as domain name in reverse notation. All **BusHandles** thereby designate a hierarchical structure, which the BusHandler in conjunction with the BusWorker operate upon.

Example

Library-wide **BusHandle**:

```
import { BusHandle } from '@sgrud/bus';

const busHandle: BusHandle = 'io.github.sgrud';
```

Example

An invalid **BusHandle**:

```
import { BusHandle } from '@sgrud/bus';

const busHandle: BusHandle = 'org.example';
// Type [...] is not assignable to type 'BusHandle'.
```

See

BusHandler

Defined in packages/bus/src/handler/handler.ts:35

bus.BusHandler

BusHandler

• **BusHandler**: Object

The **BusHandler** is a Singleton class, implementing and orchestrating the establishment, transferral and deconstruction of busses in conjunction with the BusWorker process. To designate different busses, the string literal helper type BusHandle is employed. As an example, let the following hierarchical structure be given:

```
io.github.sgrud
├── io.github.sgrud.core
│   ├── io.github.sgrud.core.httpState
│   └── io.github.sgrud.core.kernel
├── io.github.sgrud.data
│   ├── io.github.sgrud.data.model.current
│   └── io.github.sgrud.data.model.global
├── io.github.sgrud.shell
└── io.github.sgrud.shell.route
```

Depending on the BusHandle, one may subscribe to all established busses beneath the root io.github.sgrud handle or only to a specific bus, e.g., io.github.sgrud.core.kernel. The resulting Observable will either emit all values passed through all busses with their corresponding BusHandles, or only the specific scoped values, corresponding to the BusHandle.

Decorator

Singleton

See

BusWorker

Defined in packages/bus/src/handler/handler.ts:120

bus.BusHandler.constructor

constructor

• **new BusHandler**(tuples?)

Public **constructor**. As this class is a transparent Singleton, calling the new operator on it will always yield the same instance. The new operator can therefore be used to bulk-publish busses.

Example

Set the 'io.github.sgrud.example' bus:

```
import { BusHandler } from '@sgrud/bus';
import { of } from 'rxjs';

new BusHandler([
```

```
['io.github.sgrud.example', of('published')]  
]);
```

Parameters

Name	Type	Description
tuples?	['\${string}.\${string}.\${string}', Observable<any>][]	List of busses to publish.

Defined in packages/bus/src/handler/handler.ts:158

bus.BusHandler.get

get

► **get**<T>(handle): Observable<BusValue<T>>

Invoking this method **gets** the Observable bus represented by the supplied handle. The method will return an Observable originating from the BusWorker which emits all BusValues published under the supplied handle. When **getting** 'io.github.sgrud', all busses hierarchically beneath this handle, e.g., 'io.github.bus.status', will also be emitted by the returned Observable.

Example

Get the 'io.github.sgrud' bus:

```
import { BusHandler } from '@sgrud/bus';  
  
const busHandler = new BusHandler();  
busHandler.get('io.github.sgrud.example').subscribe(console.log);
```

Type parameters

Name	Description
T	Bus type.

Parameters

Name	Type	Description
handle	'\${string}.\${string}.\${string}'	BusHandle to get .

Returns Observable<BusValue<T>>

Observable bus for handle.

Defined in packages/bus/src/handler/handler.ts:192

bus.BusHandler.set

set

► **set**<T>(handle, bus): void

Publishes the supplied Observable bus under the supplied handle. Calling this method registers the supplied Observable with the BusWorker. When the Observable completes, the registration will self-destruct. When overwriting a registration by supplying a previously used handle in conjunction with a different Observable bus, the previously supplied Observable will be unsubscribed.

Example

Set the 'io.github.sgrud.example' bus:

```
import { BusHandler } from '@sgrud/bus';
import { of } from 'rxjs';

const busHandler = new BusHandler();
busHandler.set('io.github.sgrud.example', of('published'));
```

Type parameters

Name	Description
T	Bus type.

Parameters

Name	Type	Description
handle	'\${string}.\${string}.\${string}'	BusHandle to set .
bus	Observable<T>	Observable bus for handle.

Returns

void

Defined in packages/bus/src/handler/handler.ts:225

bus.BusHandler.worker

worker

- Readonly **worker**: Thread<BusWorker>

Spawned **worker** process and main bus workhorse. The underlying BusWorker is run inside a Worker context and handles all published and subscribed busses and the aggregation of their values depending on their BusHandle, i.e., hierarchy.

Decorator

Spawn

Defined in packages/bus/src/handler/handler.ts:136

bus.BusValue

BusValue

- **BusValue**<T>: Object

The **BusValue** is an interface describing the shape of all values emitted by any bus. As busses are Observable streams, which are dynamically merged through their hierarchical structure and therefore may emit more than one value from more than one handle, each value emitted by any bus contains its originating handle and its typed internal value.

Example

Logging emitted **BusValues**.

```
import { BusHandler } from '@sgrud/bus';

const busHandler = new BusHandler();
busHandler.get('io.github.sgrud').subscribe(console.log);
// { handle: 'io.github.sgrud.example', value: 'published' }
```

See

BusHandler

Type parameters

Name	Description
T	Bus type.

Defined in packages/bus/src/handler/handler.ts:61

bus.BusValue.handle

handle

- Readonly **handle**: `\${string}.\${string}.\${string}`

Emitting BusHandle.

Defined in packages/bus/src/handler/handler.ts:68

bus.BusValue.value

value

- Readonly **value**: T

Emitted value.

Defined in packages/bus/src/handler/handler.ts:73

bus.BusWorker

BusWorker

- **BusWorker**: Object

The **BusWorker** is a Worker process, Spawned by the BusHandler to handle all published and subscribed to busses and the aggregation of their values depending on their hierarchy.

Decorator

Thread

Decorator

Singleton

See

BusHandler

Defined in packages/bus/src/worker/index.ts:23

bus.BusWorker.constructor

constructor

- **new BusWorker()**

Public **constructor**. This **constructor** is called once when the BusHandler Spawns the Worker running this class.

Defined in packages/bus/src/worker/index.ts:53

bus.BusWorker.get

get

► **get**(handle): Observable<BusValue<any>>

Invoking this method **gets** the Observable bus represented by the supplied handle. This method is called by the BusHandler and is only then proxied to the Worker running this class.

Parameters

Name	Type	Description
handle	'\${string}.\${string}.\${string}'	BusHandle to get .

Returns Observable<BusValue<any>>

Observable bus for handle.

Defined in packages/bus/src/worker/index.ts:72

bus.BusWorker.set

set

► **set**(handle, bus): void

Invoking this method **sets** the supplied Observable bus for the supplied handle. This method is called by the BusHandler and is only then proxied to the Worker running this class.

Parameters

Name	Type	Description
handle bus	'\${string}.\${string}.\${string}' Observable<any>	BusHandle to set . Observable bus for handle.

Returns void

Defined in packages/bus/src/worker/index.ts:99

bus.BusWorker.busses

busses

• Private Readonly **busses**: Map<'\${string}.\${string}.\${string}', Observable<BusValue<any>>>

Internal mapping containing all established **busses**. Updating this mapping should always be accompanied by an emittance of *changes*.

Defined in packages/bus/src/worker/index.ts:29

bus.BusWorker.changes

changes

- Private Readonly **changes**: BehaviorSubject<BusWorker>

BehaviorSubject emitting every time a bus is added or deleted from the internal *busses* mapping, i.e., when **changes** occur on the *busses* mapping. This emittance is used to recompile the open Subscriptions previously obtained to through use of the *get* method.

Defined in packages/bus/src/worker/index.ts:40

bus.Publish

Publish

► **Publish**(handle, source?): (prototype: object, propertyKey: PropertyKey) => void

Prototype property decorator factory. This decorator **publishes** the decorated property value under the supplied handle. If the supplied source isn't an Observable it is assumed to reference a property key of the prototype containing the decorated property. The first instance value assigned to this source property is assigned as readonly on the instance and appended to the supplied handle, thus creating an *instance-scoped handle*. This *scoped handle* is then used to **publish** the first instance value assigned to the decorated property. This implies that the publication to the underlying bus will wait until both the decorated property and the referenced source property are assigned values. If the supplied source is of an Observable type, this Observable is **published** under the supplied handle and assigned as readonly to the decorated prototype property. If no source is supplied, a new Subject will be created and implicitly supplied as source. This decorator is more or less the opposite of the Subscribe decorator, while both rely on the BusHandler to fulfill contracts.

Precautions should be taken to ensure completion of the supplied Observable source as otherwise memory leaks may occur due to dangling subscriptions.

Example

Publish the 'io.github.sgrud.example' bus:

```
import type { Subject } from 'rxjs';
import { Publish } from '@sgrud/bus';

export class Publisher {

  @Publish('io.github.sgrud.example')
  public readonly bus!: Subject<any>;

}
```

```
Publisher.prototype.bus.complete();
```

Example

Publish the 'io.github.sgrud.example' bus:

```
import { Publish } from '@sgrud/bus';
import { Subject } from 'rxjs';

export class Publisher {

  @Publish('io.github.sgrud', 'scope')
  public readonly bus: Subject<any> = new Subject<any>();

  public constructor(
    private readonly scope: string
  ) { }

}
```

```
const publisher = new Publisher('example');
publisher.bus.complete();
```

See

- BusHandler
- Subscribe

Parameters

Name	Type	Description
handle	'\${string}.\${string}.\${string}'	BusHandle to publish .
source	PropertyKey Observable<any>	Property key or Observable.

Returns

fn

Prototype property decorator.

► (prototype, propertyKey): void

Parameters

Name	Type
prototype	object
propertyKey	PropertyKey

Returns

void

Defined in packages/bus/src/handler/publish.ts:76

bus.Subscribe

Subscribe

► **Subscribe**(handle, source?): (prototype: object, propertyKey: PropertyKey) => void

Prototype property decorator factory. This decorator **subscribes** to an Observable emitting BusValues originating from the supplied handle by assigning it to the decorated property. If no source is supplied, this Observable is assigned as readonly to the decorated prototype property. Else the supplied source is assumed to be referencing a property key of the prototype containing the decorated property. The first instance value assigned to this source property is assigned as readonly on the instance and appended to the supplied handle, thus creating an *instance-scoped handle*. This *scoped handle* is then used to create an Observable which is assigned as readonly to the decorated property on the instance. This implies that the decorated property will not be assigned an Observable until the referenced source property is assigned an instance value. This decorator is more or less the opposite of the Publish decorator, while both rely on the BusHandler to fulfill contracts.

Example

Subscribe to the 'io.github.sgrud.example' bus:

```
import type { BusValue } from '@sgrud/bus';
import type { Observable } from 'rxjs';
import { Subscribe } from '@sgrud/bus';

export class Subscriber {

  @Subscribe('io.github.sgrud.example')
  public readonly bus!: Observable<BusValue<any>>;

}
```

Example

Subscribe to the 'io.github.sgrud.example' bus:

```
import type { BusValue } from '@sgrud/bus';
import type { Observable } from 'rxjs';
import { Subscribe } from '@sgrud/bus';

export class Subscriber {

  @Subscribe('io.github.sgrud', 'scope')
  public readonly bus!: Observable<BusValue<any>>;

}
```

```

    public constructor(
      public readonly scope: string
    ) { }
  }

  const subscriber = new Subscriber('example');

```

See

- BusHandler
- Publish

Parameters

Name	Type	Description
handle source?	'\${string}.\${string}.\${string}' PropertyKey	BusHandle to subscribe to. Property key.

Returns

fn

Prototype property decorator.

► (prototype, propertyKey): void

Parameters

Name	Type
prototype	object
propertyKey	PropertyKey

Returns

void

Defined in packages/bus/src/handler/subscribe.ts:68

Module: core

core

- **core**: Object

@sgrud/core - The SGRUD Core Module.

The functions and classes found within this module represent the base upon which the SGRUD client libraries are built. Therefore, most of the code provided within this module does not aim at fulfilling one specific high-level need, but is used and intended to be used as low-level building blocks for downstream projects. This practice is employed throughout the SGRUD client libraries, as all modules depend on this core module. By providing the core functionality within this singular module, all downstream SGRUD modules should be considered opt-in functionality which may be used within projects building upon the SGRUD client libraries.

Defined in packages/core/index.ts:19

core.Assign

Assign

T Assign<S, T>: { [K in keyof (S & T)]: K extends keyof S ? S[K] : K extends keyof T ? T[K] : never }

Type helper **assigning** the own property types of all of the enumerable own properties from a source type to a target type.

Example

Assign valueOf() to string:

```
import type { Assign } from '@sgrud/core';

const str = 'Hello world' as Assign<{
  valueOf(): 'Hello world';
}, string>;
```

Type parameters

Name	Description
S	Source type.
T	Target type.

Defined in packages/core/src/typing/assign.ts:18

core.Factor

Factor

► **Factor**<K>(targetFactory): (prototype: object, propertyKey: PropertyKey) => void

Prototype property decorator factory. Replaces the decorated prototype property with a getter, which looks up the linked instance of a target constructor forwarded-referenced by the targetFactory.

Example

Factor a service:

```
import { Factor } from '@sgrud/core';
import { Service } from './service';

export class ServiceHandler {

  @Factor(() => Service)
  private readonly service!: Service;

}
```

See

- Linker
- Target

Type parameters

Name	Type	Description
K	extends () => any	Constructor type.

Parameters

Name	Type	Description
targetFactory	() => K	Forward reference to the target constructor.

Returns `fn`

Prototype property decorator.

► (prototype, propertyKey): void

Parameters

Name	Type
prototype	object
propertyKey	PropertyKey

Returns `void`

Defined in `packages/core/src/linker/factor.ts:32`

`core.HttpClient`

HttpClient

• **HttpClient**: Object

The Singleton **HttpClient** is a thin wrapper around the ajax method. The main function of this wrapper is to pipe all requests through a chain of classes extending the abstract `HttpProxy` class. Thereby interceptors for various requests can be implemented to, e.g., provide API credentials etc.

Decorator

Singleton

See

`HttpProxy`

Defined in `packages/core/src/http/client.ts:54`

`core.HttpClient.delete`

delete

► Static **delete**<T>(url): Observable<AjaxResponse<T>>

Fires an HTTP **DELETE** request against the supplied url upon subscription.

Example

Fire an HTTP **DELETE** request against `https://example.com`:

```
import { HttpClient } from '@sgrud/core';
```

```
HttpClient.delete('https://example.com').subscribe(console.log);
```

Type parameters

Name	Description
T	Response type.

Parameters

Name	Type	Description
url	string	Request URL.

Returns Observable<AjaxResponse<T>>

Observable of the requested AjaxResponse.

Defined in packages/core/src/http/client.ts:75

core.HttpClient.get

get

► Static **get**<T>(url): Observable<AjaxResponse<T>>

Fires an HTTP **GET** request against the supplied url upon subscription.

Example

Fire an HTTP **GET** request against https://example.com:

```
import { HttpClient } from '@sgrud/core';  
HttpClient.get('https://example.com').subscribe(console.log);
```

Type parameters

Name	Description
T	Response type.

Parameters

Name	Type	Description
url	string	Request URL.

Returns Observable<AjaxResponse<T>>

Observable of the requested AjaxResponse.

Defined in packages/core/src/http/client.ts:97

core.HttpClient.head

head

► Static **head**<T>(url): Observable<AjaxResponse<T>>

Fires an HTTP **HEAD** request against the supplied url upon subscription.

Example

Fire an HTTP **HEAD** request against https://example.com:

```
import { HttpClient } from '@sgrud/core';  
HttpClient.head('https://example.com').subscribe(console.log);
```

Type parameters

Name	Description
T	Response type.

Parameters

Name	Type	Description
url	string	Request URL.

Returns Observable<AjaxResponse<T>>

Observable of the requested AjaxResponse.

Defined in packages/core/src/http/client.ts:120

core.HttpClient.patch

patch

► Static **patch**<T>(url, body): Observable<AjaxResponse<T>>

Fires an HTTP **PATCH** request against the supplied url containing the supplied body upon subscription.

Example

Fire an HTTP **PATCH** request against https://example.com:

```
import { HttpClient } from '@sgrud/core';

HttpClient.patch('https://example.com', {
  bodyContent: 'value'
}).subscribe(console.log);
```

Type parameters

Name	Description
T	Response type.

Parameters

Name	Type	Description
url	string	Request URL.
body	unknown	Request body.

Returns Observable<AjaxResponse<T>>

Observable of the requested AjaxResponse.

Defined in packages/core/src/http/client.ts:146

core.HttpClient.post

post

► Static **post**<T>(url, body): Observable<AjaxResponse<T>>

Fires an HTTP **POST** request against the supplied url containing the supplied body upon subscription.

Example

Fire an HTTP **POST** request against https://example.com:

```
import { HttpClient } from '@sgrud/core';

HttpClient.post('https://example.com', {
  bodyContent: 'value'
}).subscribe(console.log);
```

Type parameters

Name	Description
T	Response type.

Parameters

Name	Type	Description
url	string	Request URL.
body	unknown	Request body.

Returns Observable<AjaxResponse<T>>

Observable of the requested AjaxResponse.

Defined in packages/core/src/http/client.ts:172

core.HttpClient.put

put

► Static **put**<T>(url, body): Observable<AjaxResponse<T>>

Fires an HTTP **PUT** request against the supplied url containing the supplied body upon subscription.

Example

Fire an HTTP **PUT** request against https://example.com:

```
import { HttpClient } from '@sgrud/core';
```

```
HttpClient.put('https://example.com', {  
  bodyContent: 'value'  
}).subscribe(console.log);
```

Type parameters

Name	Description
T	Response type.

Parameters

Name	Type	Description
url	string	Request URL.
body	unknown	Request body.

Returns Observable<AjaxResponse<T>>

Observable of the requested AjaxResponse.

Defined in packages/core/src/http/client.ts:198

core.HttpClient.constructor

constructor

- `new HttpClient()`

`core.HttpClient.handle`

handle

► **handle**<T>(request): Observable<AjaxResponse<T>>

Generic **handle** method, enforced by the `HttpHandler` interface. Main method of the this class. Internally pipes the request through all linked classes extending `HttpProxy`.

Example

Fire an HTTP custom request against `https://example.com`:

```
import { HttpClient } from '@sgrud/core';
```

```
HttpClient.prototype.handle({  
  method: 'GET',  
  url: 'https://example.com',  
  headers: { 'x-example': 'value' }  
}).subscribe(console.log);
```

Type parameters

Name	Description
T	Response type.

Parameters

Name	Type	Description
request	AjaxConfig	Requesting AjaxConfig.

Returns `Observable<AjaxResponse<T>>`

Observable of the requested `AjaxResponse`.

Implementation of `HttpHandler.handle`

Defined in `packages/core/src/http/client.ts:229`

`core.HttpHandler`

HttpHandler

- **HttpHandler**: Object

The **HttpHandler** interface enforces the generic *handle* method with ajax compliant typing on the implementing class or object. This contract is used by the `HttpProxy` to type the next hops in the `HttpClient` proxy chain.

See

`HttpClient`

Defined in `packages/core/src/http/client.ts:19`

`core.HttpHandler.handle`

handle

► **handle**<T>(request): Observable<AjaxResponse<T>>

Generic **handle** method enforcing ajax compliant typing. The method signature corresponds to that of the ajax method itself.

Type parameters

Name	Description
T	Response type.

Parameters

Name	Type	Description
request	AjaxConfig	Requesting AjaxConfig.

Returns Observable<AjaxResponse<T>>

Observable of the requested AjaxResponse.

Defined in packages/core/src/http/client.ts:34

core.HttpProxy

HttpProxy

• Abstract **HttpProxy**: Object

Abstract **HttpProxy** base class to implement proxies, i.e., HTTP request interceptors, on the client side. By extending this abstract base class and providing the extending class to the Linker, e.g., by Targeting it, the respective classes *proxy* method will be called with the request details (which could have been modified by a previous **HttpProxy**) and the next **HttpHandler** (which could be the next **HttpProxy** or the ajax method), whenever a request is fired through the **HttpClient**.

Decorator

Provide

Example

Simple **HttpProxy** intercepting file: requests:

```
import type { HttpHandler, HttpProxy } from '@sgrud/core';
import type { AjaxConfig, AjaxResponse } from 'rxjs/ajax';
import { Provider, Target } from '@sgrud/core';
import { Observable, of } from 'rxjs';
import { file } from './file';

@Target<typeof FileProxy>()
export class FileProxy
  extends Provider<typeof HttpProxy>('sgrud.core.http.HttpProxy') {

  public override proxy<T>(
    request: AjaxConfig,
    handler: HttpHandler
  ): Observable<AjaxResponse<T>> {
    if (request.url.startsWith('file:')) {
      return of<AjaxResponse<T>>(file);
    }

    return handler.handle<T>(request);
  }
}
```

See

HttpClient

Defined in packages/core/src/http/proxy.ts:53

core.HttpProxy.provide

provide

■ Static Readonly **provide**: "sgrud.core.http.HttpProxy"

Magic string by which this class is provided.

See

provide

Defined in packages/core/src/http/proxy.ts:62

core.HttpProxy.constructor

constructor

• **new HttpProxy()**

core.HttpProxy.proxy

proxy

► Abstract **proxy**<T>(request, handler): Observable<AjaxResponse<T>>

The **proxy** method of linked classes extending the HttpProxy base class is called whenever a request is fired through the HttpClient. The extending class can either pass the request to the next handler, with or without modifying it, or an interceptor can chose to completely handle a request by itself through returning an Observable AjaxResponse.

Type parameters

Name	Description
T	Response type.

Parameters

Name	Type	Description
request handler	AjaxConfig HttpHandler	Requesting AjaxConfig. Next HttpHandler.

Returns Observable<AjaxResponse<T>>

Observable of the requested AjaxResponse.

Defined in packages/core/src/http/proxy.ts:84

core.HttpState

HttpState

• **HttpState**: Object

The Targeted Singleton **HttpState** is a built-in HttpProxy intercepting all requests fired through the HttpClient. This proxy implements the observable pattern, through which it emits an array of all currently open connections every time a new request is fired or a previously fired request completes.

Decorator

Target

Decorator

Singleton

See

- HttpClient
- HttpProxy

Defined in packages/core/src/http/state.ts:30

core.HttpState.provide

provide

■ Static Readonly **provide**: "sgrud.core.http.HttpProxy"

Magic string by which this class is provided.

See

provide

Inherited from HttpProxy.[provide]

Defined in packages/core/src/http/proxy.ts:62

core.HttpState.observable

observable

• Readonly **observable**: () => Observable<AjaxResponse<any>[]>

Type declaration ▶ (): Observable<AjaxResponse<any>[]>

Symbol property typed as callback to a Observable. The returned Observable emits an array of all active requests whenever this list changes. Using the returned Observable, e.g., a load indicator can easily be implemented.

Example

Subscribe to the currently active requests:

```
import { HttpState, Linker } from '@sgrud/core';
import { from } from 'rxjs';

const httpState = new Linker<typeof HttpState>().get(HttpState);
from(httpState).subscribe(console.log);
```

Returns Observable<AjaxResponse<any>[]>

Callback to a Observable.

Defined in packages/core/src/http/state.ts:53

core.HttpState.constructor

constructor

- **new** `HttpState()`

Public **constructor**. Called by the Target decorator to link this `HttpProxy` into the proxy chain.

Overrides `HttpProxy.constructor`

Defined in `packages/core/src/http/state.ts:90`

`core.HttpState.proxy`

proxy

► **proxy**<T>(request, handler): `Observable<AjaxResponse<T>>`

Overridden **proxy** method of the `HttpProxy` base class. Mutates the request to also emit progress events while the it is running. These progress events will be consumed by the `HttpState` interceptor and re-supplied via the `Subscribable` returned by the `interop` getter.

Type parameters

Name	Description
T	Response type.

Parameters

Name	Type	Description
request handler	<code>AjaxConfig</code> <code>HttpHandler</code>	Requesting <code>AjaxConfig</code> . Next <code>HttpHandler</code> .

Returns `Observable<AjaxResponse<T>>`

Observable of the requested `AjaxResponse`.

Overrides `HttpProxy.proxy`

Defined in `packages/core/src/http/state.ts:116`

`core.HttpState.changes`

changes

- Private Readonly **changes**: `BehaviorSubject<HttpState>`

`BehaviorSubject` emitting every time a request is added to or deleted from the internal *running* mapping.

Defined in `packages/core/src/http/state.ts:61`

`core.HttpState.running`

running

- Private Readonly **running**: `Map<AjaxConfig, AjaxResponse<any>>`

Internal mapping containing all running requests. Updating this map should always be accompanied by an emittance of the *changes* `BehaviorSubject`.

Defined in packages/core/src/http/state.ts:69

core.Kernel

Kernel

• **Kernel**: Object

Singleton **Kernel** class. The **Kernel** is essentially a dependency loader for ESM bundles (and their respective importmaps) or, depending on the runtime context and capabilities, UMD bundles and their transitive dependencies. By making use of the **Kernel**, applications based on the SGRUD client libraries may be comprised of multiple, optionally loaded Modules, which, depending on the application structure and configuration, can be loaded initially, by supplying them as dependencies through the corresponding API endpoint (which can be customized through the second parameter to the *constructor*), or later on, manually.

Decorator

Singleton

See

Module

Defined in packages/core/src/kernel/kernel.ts:17

packages/core/src/kernel/kernel.ts:183

core.Kernel.observable

observable

• Readonly **observable**: () => Subscribable<Module>

Type declaration ▶ (): Subscribable<Module>

Symbol property typed as callback to a Subscribable. The returned Subscribable emits every Module that is successfully loaded.

Example

Subscribe to the stream of loaded Modules:

```
import { Kernel } from '@sgrud/core';
import { from } from 'rxjs';

from(new Kernel()).subscribe(console.log);
```

Returns Subscribable<Module>

Callback to a Subscribable.

Defined in packages/core/src/kernel/kernel.ts:203

core.Kernel.baseHref

baseHref

• Readonly **baseHref**: string = location.origin

Base href for building, e.g., the *endpoint* and *nodeModule* URLs.

Default Value

location.origin

Defined in packages/core/src/kernel/kernel.ts:297

core.Kernel.constructor

constructor

• **new Kernel**(baseHref?, endpoint?, nodeModules?)

Singleton **constructor**. The first time, this **constructor** is called, it will retrieve the list of modules which should be loaded and then call *insmod* on all those modules and their transitive dependencies. Every subsequent **constructor** call will ignore all arguments and return the Singleton instance. Through subscribing to the Subscribable returned by the observable interop getter, the initial Module loading progress can be tracked.

Example

Instantiate the **Kernel**:

```
import { Kernel } from '@sgrud/core';

const kernel = new Kernel(
  'https://example.com',
  '/context/api/sgrud',
  'https://unpkg.com'
);
```

Parameters

Name	Type	Default value	Description
baseHref	string	location.origin	Base href for building URLs.
endpoint	string	undefined	Href of the SGRUD API endpoint.
nodeModules	string	undefined	Href to load node modules from.

Defined in packages/core/src/kernel/kernel.ts:290

core.Kernel.endpoint

endpoint

• Readonly **endpoint**: string

Href of the SGRUD API **endpoint**. Modules to be initially loaded (by their names) are requested from the URL \${endpoint}/insmod when this class is constructed for the first time.

Default Value

baseHref + '/api/sgrud/v1'

Defined in packages/core/src/kernel/kernel.ts:309

core.Kernel.insmod

insmod

► **insmod**(module, source?, entryModule?): Observable<Module>

Insert modules. Calling this method while supplying a valid module definition will chain the module dependencies and the module itself into an Observable, which is then returned. When multiple modules are inserted, their dependencies are deduplicated by internally tracking all modules and their transitive dependencies as separate *loaders*. Depending on the browser context, either the UMD or ESM bundles (and their respective importmaps) are loaded via calling the *script* method. When inserting Modules which

contain transitive *sgrudDependencies*, their compatibility is checked. Should a dependency version mismatch, the returned Observable will throw.

Throws

Observable of RangeError or ReferenceError.

Example

Insert a module by definition:

```
import { Kernel } from '@sgrud/core';
import packageJson from 'module/package.json';

new Kernel().insmod(packageJson).subscribe(console.log);
```

Parameters

Name	Type	Default value	Description
module	Module	undefined	Module definition.
source	string	undefined	Optional Module source.
entryModule	boolean	false	Wether to run the Module.

Returns

 Observable<Module>

Observable of the Module loading.

Defined in

 packages/core/src/kernel/kernel.ts:372

core.Kernel.nodeModules

nodeModules

• Readonly **nodeModules**: string

Href to load node modules from. All JavaScript assets belonging to packages installed via NPM should be located here.

Default Value

baseHref + '/node_modules'

Defined in

 packages/core/src/kernel/kernel.ts:317

core.Kernel.resolve

resolve

► **resolve**(name, source?): Observable<Module>

Resolves a Module definition by its name. The Module name is appended to the *nodeModules* path and the package.json file therein retrieved via HTTP GET. The parsed package.json is then emitted by the returned Observable.

Example

Resolve a Module definition:

```
import { Kernel } from '@sgrud/core';

new Kernel().resolve('module').subscribe(console.log);
```

Parameters

Name	Type	Description
name	string	Module name.
source	string	Optional Module source.

Returns Observable<Module>

Observable of the Module definition.

Defined in packages/core/src/kernel/kernel.ts:501

core.Kernel.script

script

► **script**(props): Observable<void>

Inserts an HTMLScriptElement and applies the supplied props to it. The returned Observable emits and completes when the *onload* handler is called on the HTMLScriptElement. If no external *src* is supplied through the props, the *onload* handler is called asynchronously. When the returned Observable completes, the inserted HTMLScriptElement is removed.

Example

Insert an HTMLScriptElement:

```
import { Kernel } from '@sgrud/core';

new Kernel().script({
  src: '/node_modules/module/bundle.js',
  type: 'text/javascript'
}).subscribe();
```

Parameters

Name	Type	Description
props	Partial<HTMLScriptElement>	HTMLScriptElement properties.

Returns Observable<void>

Observable of the HTMLScriptElements load and removal.

Defined in packages/core/src/kernel/kernel.ts:539

core.Kernel.verify

verify

► **verify**(props): Observable<void>

Inserts an HTML link element and applies the supplied props to it. This method should be used to **verify** a Module bundle before importing and evaluating it, by providing its Subresource Integrity.

Example

Verify the Subresource Integrity:

```
import { Kernel } from '@sgrud/core';

new Kernel().verify({
  href: '/node_modules/module/index.js',
  integrity: 'sha256-[...]',
  rel: 'modulepreload'
}).subscribe();
```

Parameters

Name	Type	Description
props	Partial<HTMLLinkElement>	Link element properties.

Returns

 Observable<void>

Observable of link appendage and removal.

Defined in

 packages/core/src/kernel/kernel.ts:584

core.Kernel.imports

imports

- Private Readonly **imports**: Map<string, string>

Internal mapping of all via importmaps defined Module identifiers to their corresponding paths. This mapping is used for housekeeping, e.g., to prevent the same Module identifier to be defined multiple times.

Defined in

 packages/core/src/kernel/kernel.ts:212

core.Kernel.loaders

loaders

- Private Readonly **loaders**: Map<string, ReplaySubject<Module>>

Internal mapping of all Modules **loaders** to a ReplaySubject. This ReplaySubject tracks the Module loading process as such, that it emits the Module definition once the respective Module is fully loaded (including dependencies etc.) and then completes.

Defined in

 packages/core/src/kernel/kernel.ts:223

core.Kernel.loading

loading

- Private Readonly **loading**: ReplaySubject<Module>

Internal ReplaySubject tracking the **loading** state of Modules. An Observable form of this ReplaySubject may be retrieved by subscribing to the Subscribable returned by the interop getter. The internal ReplaySubject (and the retrievable Observable) emits all Module definitions loaded throughout the lifespan of this class.

Defined in

 packages/core/src/kernel/kernel.ts:237

core.Kernel.shimmed

shimmed

- Private Readonly **shimmed**: string

Internally used string to suffix the importmap and module types of HTMLScriptElements with, if applicable. This string is set to whatever trails the type of HTMLScriptElements encountered upon initialization, iff their type starts with importmap.

Defined in packages/core/src/kernel/kernel.ts:247

core.Kernel

Kernel

• **Kernel**: Object

Kernel namespace containing types and interfaces used and intended to be used in conjunction with the Singleton Kernel class.

See

Kernel

Defined in packages/core/src/kernel/kernel.ts:17

packages/core/src/kernel/kernel.ts:183

core.Kernel.Digest

Digest

T **Digest**: 'sha\${256 | 384 | 512}-\${string}'

String literal helper type. Enforces any assigned string to represent a browser-parsable **Digest** hash.

Example

A valid **Digest**:

```
import type { Digest } from '@sgrud/core';  
  
const digest: Digest = 'sha256-[';'
```

Defined in packages/core/src/kernel/kernel.ts:31

core.Kernel.Module

Module

• **Module**: Object

Interface describing the shape of a **Module** while being aligned with well-known package.json fields. This interface additionally specifies optional sgrudDependencies and webDependencies mappings, which both are used by the Kernel to determine SGRUD module dependencies and runtime (web) dependencies.

Example

An exemplary **Module** definition:

```
import type { Kernel } from '@sgrud/core';  
  
const module: Kernel.Module = {  
  name: 'module',  
  version: '0.0.0',  
  exports: './module.exports.js',  
  unpkg: './module.unpkg.js',  
  sgrudDependencies: {  
    sgrudDependency: '^0.0.1'  
  },  
  webDependencies: {  
    webDependency: {  
      exports: {  
        webDependency: './webDependency.exports.js'  
      },  
      unpkg: [  
        './webDependency.unpkg.js'  
      ]  
    }  
  }  
};
```

```

    }
  }
};

```

Defined in packages/core/src/kernel/kernel.ts:70

Kernel.Module.digest

digest

- Optional Readonly **digest**: Record<string, 'sha256-\${string}' | 'sha384-\${string}' | 'sha512-\${string}'>

Optional bundle Digests. If hashes are supplied, they will be used to verify the Subresource Integrity of the respective bundles.

Defined in packages/core/src/kernel/kernel.ts:101

Kernel.Module.exports

exports

- Optional Readonly **exports**: string

ESM entry point.

Defined in packages/core/src/kernel/kernel.ts:87

Kernel.Module.name

name

- Readonly **name**: string

Name of the **Module**.

Defined in packages/core/src/kernel/kernel.ts:75

Kernel.Module.sgrudDependencies

sgrudDependencies

- Optional Readonly **sgrudDependencies**: Record<string, string>

Optional SGRUD dependencies.

Defined in packages/core/src/kernel/kernel.ts:108

Kernel.Module.unpkg

unpkg

- Optional Readonly **unpkg**: string

UMD entry point.

Defined in packages/core/src/kernel/kernel.ts:92

Kernel.Module.version

version

- Readonly **version**: string

Module version, formatted as semver.

Defined in packages/core/src/kernel/kernel.ts:82

Kernel.Module.webDependencies

webDependencies

- Optional Readonly **webDependencies**: Record<string, WebDependency>

Optional WebDependency mapping.

Defined in packages/core/src/kernel/kernel.ts:115

core.Kernel.WebDependency

WebDependency

- **WebDependency**: Object

Interface describing runtime dependencies of a Module. A Module may specify an array of UMD bundles to be loaded by the Kernel through the unpkg property. A Module may also specify a mapping of import specifiers to Module-relative paths through the exports property. Every specified **WebDependency** is loaded before respective bundles of the Module, which depends on the specified **WebDependency**, will be loaded themselves.

Example

An exemplary **webDependency** definition:

```
import type { Kernel } from '@sgrud/core';

const webDependency: Kernel.WebDependency = {
  exports: {
    webDependency: './webDependency.exports.js'
  },
  unpkg: [
    './webDependency.unpkg.js'
  ]
};
```

Defined in packages/core/src/kernel/kernel.ts:147

Kernel.WebDependency.exports

exports

- Optional Readonly **exports**: Record<string, string>

Optional ESM runtime dependencies.

Defined in packages/core/src/kernel/kernel.ts:152

Kernel.WebDependency.unpkg

unpkg

- Optional Readonly **unpkg**: string[]

Optional UMD runtime dependencies.

Defined in packages/core/src/kernel/kernel.ts:157

core.Linker

Linker

• **Linker**<K, V>: Object

The Singleton **Linker** class provides the means to lookup instances of Targeted constructors. The **Linker** is used throughout the SGRUD client libraries, e.g., by the Factor decorator, to provide and retrieve different centrally provisioned class instances. To programmatically insert some links, the inherited *constructor* or *set* methods can be used. The former will insert all entries into this Singleton link mapping, internally calling the latter for each.

Decorator

Singleton

Example

Preemptively link an instance:

```
import { Linker } from '@sgrud/core';
import { Service } from './service';

new Linker<typeof Service>([
  [Service, new Service('linked')]
]);
```

Type parameters

Name	Type	Description
K	extends () => V	Constructor type.
V	InstanceType<K>	Instance type.

Defined in packages/core/src/linker/linker.ts:41

core.Linker.constructor

constructor

• **new Linker**<K, V>(entries?)

Type parameters

Name	Type
K	extends () => V
V	InstanceType<K>

Parameters

Name	Type
entries?	null readonly readonly [K, V][]

Inherited from Map<K, V>.constructor

Defined in node_modules/typescript/lib/lib.es2015.collection.d.ts:53

• **new Linker**<K, V>(iterable?)

Type parameters

Name	Type
K	extends () => V
V	InstanceType<K>

Parameters

Name	Type
iterable?	null Iterable<readonly [K, V]>

Inherited from Map<K, V>.constructor

Defined in node_modules/typescript/lib/lib.es2015.iterable.d.ts:161

core.Linker.get

get

► **get**(target): V

Overridden **get** method. Calling this method looks up the linked instance based on the supplied target constructor. If no linked instance is found, one is created by calling the new operator on the target constructor. Therefor the target constructors must not require parameters.

Example

Retrieve a linked instance:

```
import { Linker } from '@sgrud/core';
import { Service } from './service';

new Linker<typeof Service>().get(Service);
```

Parameters

Name	Type	Description
target	K	Target constructor.

Returns

Linked instance.

Overrides Map.get

Defined in packages/core/src/linker/linker.ts:64

core.Linker.getAll

getAll

► **getAll**(target): V[]

Returns all linked instances, which satisfy instanceof target. Use this method when multiple linked target constructors extend the same base class and are to be retrieved.

Example

Retrieve all linked instances:

```
import { Linker } from '@sgrud/core';
import { Service } from './service';

new Linker<typeof Service>().getAll(Service);
```

Parameters

Name	Type	Description
target	K	Target constructor.

Returns

V[]

All linked instances.

Defined in packages/core/src/linker/linker.ts:92

core.Merge

Merge

T **Merge**<T>: T extends T ? (_: T) => T : never extends (_: infer I) => T ? I : never

Type helper to convert union types (A | B) to intersection types (A & B).

Remarks

<https://github.com/microsoft/TypeScript/issues/29594>

Type parameters

Name	Description
T	Union type.

Defined in packages/core/src/typing/merge.ts:8

core.Mutable

Mutable

T **Mutable**<T>: { -readonly [K in keyof T]: T[K] }

Type helper marking the supplied type as **Mutable** (opposed to *readonly*).

Remarks

<https://github.com/Microsoft/TypeScript/issues/24509>

Type parameters

Name	Type	Description
T	extends object	Readonly type.

Defined in packages/core/src/typing/mutable.ts:8

core.Provide

Provide

T **Provide**<K, V>: (...args: any[]) => InstanceType<V> & { [provide]: K extends Registration ? K : Registration }

Type helper enforcing the provide symbol property containing a magic string (typed as Registration) on base constructors decorated with the corresponding Provide decorator. The **Provide** type helper is also used by the Provider decorator.

See

Provide

Type parameters

Name	Type	Description
K	extends Registration	Magic string type.
V	extends (...args: any[]) => InstanceType<V>	Constructor type.

Defined in packages/core/src/super/provide.ts:78

packages/core/src/super/provide.ts:26

core.Provide

Provide

► **Provide**<V, K>(): (constructor: V) => void

Class decorator factory. **Provides** the decorated class to extending classes. Applying the **Provide** decorator enforces the Provide type which entails the declaration of a static provide property typed as Registration. The magic string assigned to this static property is used by the Provider factory function to lookup base classes within the Registry mapping.

Example

Provide a base class:

```
import { Provide, provide } from '@sgrud/core';

@Provide<typeof Base>()
export abstract class Base {

    public static readonly [provide]:
        'sgrud.example.Base' = 'sgrud.example.Base' as const;

}
```

See

- Provider
- Registry

Type parameters

Name	Type	Description
V	extends Provide<K, V>	Constructor type.
K	extends '\${string}.\${string}.\${string}' = V[typeof provide]	Magic string type.

Returns fn

Class decorator.

► (constructor): void

Parameters

Name	Type
constructor	V

Returns

void

Defined in

packages/core/src/super/provide.ts:78

core.Provider

Provider

► **Provider**<V, K>(provider): V

Provider of base classes. Extending this mixin-style function while supplying the type of a Provided constructor enforces type safety and hinting on the supplied magic string and the resulting class which extends this **Provider** mixin. The main purpose of this pattern is bridging module gaps by de-coupling bundle files while maintaining a well-defined prototype chain. This still requires the base class to be defined (and Provided) before extension but allows intellisense'd OOP patterns across multiple modules while maintaining runtime language specifications.

Example

Extend a provided class:

```
import type { Base } from 'example-module';
import { Provider } from '@sgrud/core';

export class Class
  extends Provider<typeof Base>('org.example.Base') {

  public constructor(...args: any[]) {
    super(...args);
  }
}
```

See

- Provide
- Registry

Type parameters

Name	Type	Description
V	extends Provide<K, V>	Constructor type.
K	extends '\${string}.\${string}.\${string}' = V[typeof provide]	Magic string type.

Parameters

Name	Type	Description
provider	K	Magic string.

Returns

v

Providing constructor.

Defined in packages/core/src/super/provider.ts:69

core.Provider

Provider

• **Provider**<V>: Object

Type helper to allow referencing Provided constructors as new-able targets. Used and intended to be used in conjunction with the Provider decorator.

See

Provider

Type parameters

Name	Description
V	Instance type.

Defined in packages/core/src/super/provider.ts:69

packages/core/src/super/provider.ts:16

core.Provider.provide

provide

• Readonly **provide**: '\${string}.\${string}.\${string}'

Enforced provider contract.

Defined in packages/core/src/super/provider.ts:21

core.Provider.constructor

constructor

• **constructor**: Object

core.Provider.constructor

constructor

• **new Provider**(...args)

Enforced constructor contract.

Parameters

Name	Type	Description
...args	any[]	Class constructor rest parameter.

Defined in packages/core/src/super/provider.ts:28

core.Registration

Registration

T **Registration**: `'${string}.${string}.${string}'`

String literal helper type. Enforces any assigned string to contain at least three dots. **Registrations** are used by the Registry to alias classes extending the base Provider as magic strings and should represent sane module paths in dot-notation.

Example

Library-wide **Registration** pattern:

```
import type { Registration } from '@sgrud/core';  
  
const registration: Registration = 'sgrud.module.path.ClassName';
```

See

Registry

Defined in packages/core/src/super/registry.ts:22

core.Registry

Registry

• **Registry**<K, V>: Object

The Singleton **Registry** is a mapping used by the Provider to lookup Provided constructors by Registrations upon class extension. Magic strings should represent sane module paths in dot-notation. To programmatically provide constructors by Registrations to extending classes, the inherited *constructor* or *set* methods are available. The former will insert all entries into this Singleton **Registry** map, internally calling the latter for each. Whenever a currently not registered constructor is requested, an intermediary class is created, *cached* internally and returned. When the actual constructor is registered later, the previously created intermediary class is removed from the internal caching and further steps are taken to guarantee the transparent addressing of the actual constructor through the dropped intermediary class.

Decorator

Singleton

See

- Provide
- Provider

Type parameters

Name	Type	Description
K	extends Registration	Magic string type.
V	extends (...args: any[]) => InstanceType<V>	Constructor type.

Defined in packages/core/src/super/registry.ts:59

core.Registry.constructor

constructor

• **new Registry**<K, V>(tuples?)

Public **constructor**. The constructor of this class accepts the same parameters as its overridden super **constructor** and acts the same. I.e., through instantiating this Singleton class and passing a list of tuples of Registrations and their corresponding constructors, these tuples will be stored.

Example

Preemptively provide a constructor by magic string:

```
import type { Registration } from '@sgrud/core';
import { Registry } from '@sgrud/core';
import { Service } from './service';

new Registry<Registration, typeof Service>([
  ['sgrud.example.Service', Service]
]);
```

Type parameters

Name	Type
K	extends `\${string}.\${string}.\${string}`
V	extends (...args: any[]) => InstanceType<V>

Parameters

Name	Type	Description
tuples?	[K, V][]	List of constructors to provide.

Overrides

Map<K, V>.>.constructor

Defined in

packages/core/src/super/registry.ts:109

core.Registry.get

get

► **get**(registration): V

Overridden **get** method. Looks up the Provided constructor by magic string. If no provided constructor is found, an intermediary class is created, *cached* internally and returned. While this intermediary class and the functionality supporting it takes care of inheritance, i.e., allows to forward-reference base classes to be extended, it cannot substitute for the actual extended constructor. Therefore, static extension of forward-referenced classes may be used, but as long as the actual extended constructor is not registered (and therefore the intermediary class is still acting as inheritance cache), the extending class cannot be instantiated, called etc. Doing so will result in a ReferenceError being thrown.

Throws

ReferenceError.

Example

Retrieve a provided constructor by magic string:

```
import type { Registration } from '@sgrud/core';
import type { Service } from 'example-module';
import { Registry } from '@sgrud/core';

new Registry<Registration, typeof Service>().get('org.example.Service');
```

Parameters

Name	Type	Description
registration	K	Magic string.

Returns

v

Provided constructor.

Overrides

Map.get

Defined in packages/core/src/super/registry.ts:151

core.Registry.set

set

► **set**(registration, constructor): Registry<K, V>

Overridden **set** method. Whenever a constructor is provided by magic string through calling this method, a check is run, whether this constructor was previously requested and therefore was *cached* as intermediary class. If so, the intermediary class is removed from this internal mapping and further steps are taken to guarantee the transparent addressing of the newly provided constructor through the previously *cached* and now dropped intermediary class.

Example

Preemptively provide a constructor by magic string:

```
import type { Registration } from '@sgrud/core';
import { Registry } from '@sgrud/core';
import { Service } from './service';

new Registry<Registration, typeof Service>().set(
  'org.example.Service',
  Service
);
```

Parameters

Name	Type	Description
registration	K	Magic string.
constructor	V	Providing constructor.

Returns Registry<K, V>

This instance.

Overrides Map.set

Defined in packages/core/src/super/registry.ts:207

core.Registry.cached

cached

• Private Readonly **cached**: Map<K, V>

Internally used mapping of all **cached**, i.e., forward-referenced, constructors. Whenever a constructor, which is not currently registered, is requested as a Provider, an intermediary class is created and stored within this map until the actual constructor is registered. As soon as this happens, the intermediary class is removed from this map and further steps are taken to guarantee the transparent addressing of the actual constructor through the dropped intermediary class.

Defined in packages/core/src/super/registry.ts:75

core.Registry.caches

caches

• Private Readonly **caches**: WeakSet<V>

Internally used (weak) set containing all intermediary classes created upon requesting a currently not registered constructor as provider. This (weak) set is used internally to check, if a intermediary class has already been replaced by the actual constructor.

Defined in packages/core/src/super/registry.ts:83

core.Singleton

Singleton

► **Singleton**<T>(apply?): (constructor: T) => T

Class decorator factory. Enforces a transparent **Singleton** pattern on the decorated class. When calling the new operator on a decorated class for the first time, an instance of the decorated class is created using the supplied arguments, if any. This instance will remain the **Singleton** instance of the decorated class indefinitely. When calling the new operator on a decorated class already instantiated, the **Singleton** pattern is enforced and the previously constructed instance is returned. Instead, if provided, the apply callback is fired with the **Singleton** instance and the new invocation parameters.

Example

Singleton class:

```
import { Singleton } from '@sgrud/core';

@Singleton<typeof Service>()
export class Service { }

new Service() === new Service(); // true
```

Type parameters

Name	Type	Description
T	extends (...args: any[]) => any	Constructor type.

Parameters

Name	Type	Description
apply?	(self: InstanceType<T>, args: ConstructorParameters<T>) => InstanceType<T>	Construct function.

Returns

 fn

Class decorator.

► (constructor): T

Parameters

Name	Type
constructor	T

Returns

 T

Defined in packages/core/src/utility/singleton.ts:27

core.Spawn

Spawn

► **Spawn**(worker, source?): (prototype: object, propertyKey: PropertyKey) => void

This prototype property decorator factory **Spawns** a Worker, wraps it with Comlink and assigns it to the decorated prototype property.

Example

Spawn a Worker:

```
import { Spawn, Thread } from '@sgrud/core';
import { ExampleWorker } from 'example-worker';

export class ExampleWorkerHandler {

  @Spawn('example-worker')
  private static readonly worker: Thread<ExampleWorker>;

}
```

See

Thread

Parameters

Name	Type	Description
worker source?	string Endpoint NodeEndpoint string	Worker constructor to Spawn . Optional Module source.

Returns

fn

Class property decorator.

► (prototype, propertyKey): void

Parameters

Name	Type
prototype propertyKey	object PropertyKey

Returns

void

Defined in

packages/core/src/thread/spawn.ts:39

core.Target

Target

► **Target**<K>(factoryArgs?, target?): (constructor: K) => void

Class decorator factory. Links the **Targeted** constructor to its corresponding instance by applying the supplied factoryArgs. Employ this helper to link **Targeted** constructors with required arguments. Supplying a target constructor overrides its linked instance, if any, with the constructed instance.

Example

Target a service:

```
import { Target } from '@sgrud/core';

@Target<typeof Service>(['default'])
export class Service {

  public constructor(
```

```

    public readonly param: string
  ) { }
}

```

Example

Factor a **Targeted** service:

```

import type { Target } from '@sgrud/core';
import { Factor } from '@sgrud/core';
import { Service } from './service';

export class ServiceHandler {

  @Factor<Target<Service>>(() => Service)
  public readonly service!: Service;

}

```

See

- Factor
- Linker

Type parameters

Name	Type	Description
K	extends (...args: any[]) => any	Constructor type.

Parameters

Name	Type	Description
factoryArgs?	ConstructorParameters<K>	Target constructor arguments.
target?	K	Target constructor override.

Returns

fn

Class decorator.

► (constructor): void

Parameters

Name	Type
constructor	K

Returns

void

Defined in packages/core/src/linker/target.ts:71

core.Target

Target

- **Target**<V>: Object

Type helper to allow Factoring **Targeted** constructors with required arguments. Used and to be used in conjunction with the Target decorator.

Type parameters

Name	Description
<code>V</code>	Instance type.

Defined in packages/core/src/linker/target.ts:71

packages/core/src/linker/target.ts:12

core.Target.constructor

constructor

• **constructor**: Object

core.Target.constructor

constructor

• **new Target**(...args)

Enforced constructor contract.

Parameters

Name	Type	Description
<code>...args</code>	<code>any[]</code>	Constructor arguments.

Defined in packages/core/src/linker/target.ts:19

core.Thread

Thread

T Thread<T>: Promise<Remote<T>>

Type alias describing an exposed class in a remote context. Created by wrapping a Comlink *Remote* in a *Promise*. Used and intended to be used in conjunction with the Thread decorator.

See

Thread

Type parameters

Name	Description
<code>T</code>	Instance type.

Defined in packages/core/src/thread/thread.ts:41

packages/core/src/thread/thread.ts:18

core.Thread

Thread

► **Thread**() (constructor: () => any) => void

Class decorator factory. Exposes an instance of the decorated class as Worker **Thread** via Comlink.

Example

ExampleWorker **Thread**:

```
import { Thread } from '@sgrud/core';

@Thread()
export class ExampleWorker { }
```

See

Spawn

Returns fn

Class decorator.

► (constructor): void

Parameters

Name	Type
constructor	() => any

Returns void

Defined in packages/core/src/thread/thread.ts:41

core.TypeOf

TypeOf

• Abstract **TypeOf**: Object

Strict type-assertion and runtime type-checking utility. When type-checking variables in the global scope, e.g., window or process, make use of the globalThis object.

Example

Type-check global context:

```
import { TypeOf } from '@sgrud/core';

TypeOf.process(globalThis.process); // true if running in node context
TypeOf.window(globalThis.window);  // true if running in browser context
```

Defined in packages/core/src/utility/type-of.ts:15

core.TypeOf.array

array

► Static **array**(value): value is any[]

Type-check value for Array<any>.

Example

Type-check null for Array<any>:

```
import { TypeOf } from '@sgrud/core';

TypeOf.array(null); // false
```

Parameters

Name	Type	Description
value	unknown	Value to type-check.

Returns

value is any[]

Whether value is of type Array<any>.

Defined in

packages/core/src/utility/type-of.ts:31

core.TypeOf.boolean

boolean

► Static **boolean**(value): value is boolean

Type-check value for boolean.

Example

Type-check null for boolean:

```
import { TypeOf } from '@sgrud/core';
```

```
TypeOf.boolean(null); // false
```

Parameters

Name	Type	Description
value	unknown	Value to type-check.

Returns

value is boolean

Whether value is of type boolean.

Defined in

packages/core/src/utility/type-of.ts:49

core.TypeOf.date

date

► Static **date**(value): value is Date

Type-check value for Date.

Example

Type-check null for Date:

```
import { TypeOf } from '@sgrud/core';
```

```
TypeOf.date(null); // false
```

Parameters

Name	Type	Description
value	unknown	Value to type-check.

Returns value is Date

Whether value is of type Date.

Defined in packages/core/src/utility/type-of.ts:67

core.TypeOf.function

function

► Static **function**(value): value is Function

Type-check value for Function.

Example

Type-check null for Function:

```
import { TypeOf } from '@sgrud/core';
```

```
TypeOf.function(null); // false
```

Parameters

Name	Type	Description
value	unknown	Value to type-check.

Returns value is Function

Whether value is of type Function.

Defined in packages/core/src/utility/type-of.ts:85

core.TypeOf.global

global

► Static **global**(value): value is typeof globalThis

Type-check value for global.

Example

Type-check null for typeof globalThis:

```
import { TypeOf } from '@sgrud/core';
```

```
TypeOf.global(null); // false
```

Parameters

Name	Type	Description
value	unknown	Value to type-check.

Returns value is typeof globalThis

Whether value is of type typeof globalThis.

Defined in packages/core/src/utility/type-of.ts:103

core.TypeOf.null

null

► Static **null**(value): value is null

Type-check value for null.

Example

Type-check null for null:

```
import { TypeOf } from '@sgrud/core';
```

```
TypeOf.null(null); // true
```

Parameters

Name	Type	Description
value	unknown	Value to type-check.

Returns value is null

Whether value is of type null.

Defined in packages/core/src/utility/type-of.ts:121

core.TypeOf.number

number

► Static **number**(value): value is number

Type-check value for number.

Example

Type-check null for number:

```
import { TypeOf } from '@sgrud/core';
```

```
TypeOf.number(null); // false
```

Parameters

Name	Type	Description
value	unknown	Value to type-check.

Returns value is number

Whether value is of type number.

Defined in packages/core/src/utility/type-of.ts:139

core.TypeOf.object

object

► Static **object**(value): value is object

Type-check value for object.

Example

Type-check null for object:


```
import { TypeOf } from '@sgrud/core';  
TypeOf.object(null); // false
```

Parameters

Name	Type	Description
value	unknown	Value to type-check.

Returns value is object

Whether value is of type object.

Defined in packages/core/src/utility/type-of.ts:157

core.TypeOf.process

process

► Static **process**(value): value is Process

Type-check value for NodeJS.Process.

Example

Type-check null for NodeJS.Process:

```
import { TypeOf } from '@sgrud/core';  
TypeOf.process(null); // false
```

Parameters

Name	Type	Description
value	unknown	Value to type-check.

Returns value is Process

Whether value is of type NodeJS.Process.

Defined in packages/core/src/utility/type-of.ts:175

core.TypeOf.promise

promise

► Static **promise**(value): value is Promise<any>

Type-check value for Promise<any>.

Example

Type-check null for Promise<any>:

```
import { TypeOf } from '@sgrud/core';  
TypeOf.promise(null); // false
```

Parameters

Name	Type	Description
value	unknown	Value to type-check.

Returns value is Promise<any>

Whether value is of type Promise<any>.

Defined in packages/core/src/utility/type-of.ts:193

core.TypeOf.regex

regex

► Static **regex**(value): value is RegExp

Type-check value for RegExp.

Example

Type-check null for RegExp:

```
import { TypeOf } from '@sgrud/core';
```

```
TypeOf.regex(null); // false
```

Parameters

Name	Type	Description
value	unknown	Value to type-check.

Returns value is RegExp

Whether value is of type RegExp.

Defined in packages/core/src/utility/type-of.ts:211

core.TypeOf.string

string

► Static **string**(value): value is string

Type-check value for string.

Example

Type-check null for string:

```
import { TypeOf } from '@sgrud/core';
```

```
TypeOf.string(null); // false
```

Parameters

Name	Type	Description
value	unknown	Value to type-check.

Returns value is string

Whether value is of type string.

Defined in packages/core/src/utility/type-of.ts:229

core.TypeOf.undefined

undefined

► Static **undefined**(value): value is undefined

Type-check value for undefined.

Example

Type-check null for undefined:

```
import { TypeOf } from '@sgrud/core';
```

```
TypeOf.undefined(null); // false
```

Parameters

Name	Type	Description
value	unknown	Value to type-check.

Returns value is undefined

Whether value is of type undefined.

Defined in packages/core/src/utility/type-of.ts:247

core.TypeOf.url

url

► Static **url**(value): value is URL

Type-check value for URL.

Example

Type-check null for URL:

```
import { TypeOf } from '@sgrud/core';
```

```
TypeOf.url(null); // false
```

Parameters

Name	Type	Description
value	unknown	Value to type-check.

Returns value is URL

Whether value is of type URL.

Defined in packages/core/src/utility/type-of.ts:265

core.TypeOf.window

window

► Static **window**(value): value is Window

Type-check value for Window.

Example

Type-check null for Window:

```
import { TypeOf } from '@sgrud/core';
```

```
TypeOf.window(null); // false
```

Parameters

Name	Type	Description
value	unknown	Value to type-check.

Returns

 value is Window

Whether value is of type Window.

Defined in

 packages/core/src/utility/type-of.ts:283

core.TypeOf.test

test

► Static Private **test**(type, value): boolean

Type-check value for type.

Parameters

Name	Type	Description
type	string	Type to check for.
value	unknown	Value to type-check.

Returns

 boolean

Whether value is type.

Defined in

 packages/core/src/utility/type-of.ts:294

core.TypeOf.constructor

constructor

• Private **new TypeOf()**

Private **constructor** (which should never be called).

Throws

TypeError.

Defined in

 packages/core/src/utility/type-of.ts:303

core.assign

assign

► **assign**<T, S>(target, ...sources): T & Merge<S[number]>

Assigns (deep copies) the values of all of the enumerable own properties from one or more source objects to a target object. The last value within the last source object takes precedence over any previously encountered values. Returns the target object.

Example

Assign nested properties:

```
import { assign } from '@sgrud/core';

assign(
  { one: { one: true }, two: false },
  { one: { key: null } },
  { two: true }
);

// { one: { one: true, key: null }, two: true }
```

Type parameters

Name	Type	Description
T	extends Record<PropertyKey, any>	Target type.
S	extends Record<PropertyKey, any>[]	Source types.

Parameters

Name	Type	Description
target	T	Object to assign properties to.
...sources	[...S[]]	Objects from which to deep copy properties.

Returns T & Merge<S[number]>

Assigned object.

Defined in packages/core/src/utility/assign.ts:30

core.pluralize

pluralize

► **pluralize**(singular): string

Pluralizes words of the English language.

Example

Pluralize 'money':

```
import { pluralize } from '@sgrud/core';

pluralize('money'); // 'money'
```

Example

Pluralize 'thesis':

```
import { pluralize } from '@sgrud/core';

pluralize('thesis'); // 'theses'
```

Parameters

Name	Type	Description
singular	string	English word in singular form.

Returns string

Pluralized form of singular.

Defined in packages/core/src/utility/pluralize.ts:23

core.provide

provide

• Const **provide**: typeof provide

Unique symbol used as property key by the Provide type constraint.

Defined in packages/core/src/super/provide.ts:8

core.semver

semver

► **semver**(version, range): boolean

Best-effort semver matcher. The supplied version will be tested against the supplied range.

Example

Test '1.2.3' against '>2 <1 || ~1.2.*':

```
import { semver } from '@sgrud/core';
```

```
semver('1.2.3', '>2 <1 || ~1.2.*'); // true
```

Parameters

Name	Type	Description
version	string	Tested semantic version string.
range	string	Range to test the version against.

Returns boolean

Whether version satisfies range.

Defined in packages/core/src/kernel/semver.ts:19

Module: data

data

• **data**: Object

@sgrud/data - The SGRUD Data Model.

The functions and classes found within this module are intended to ease the type safe data handling, i.e., retrieval, mutation and storage, throughout applications building upon the SGRUD client libraries. By

extending the `Model` class and applying adequate decorators to the contained properties, the resulting extension will, in its static context, provide all necessary means to interact directly with the underlying repository, while the instance context of any class extending the abstract `Model` base class will inherit methods to observe changes to its instance field values, selectively complement the instance with fields from the backing data storage via type safe graph representations and to delete the respective instance from the data storage.

Defined in `packages/data/index.ts:22`

`data.Enum`

Enum

• Abstract **Enum**: `Object`

Abstract **Enum** helper class. This class is used by the `Model` to detect enumerations within a `Graph`, as enumerations (in contrast to plain strings) must not be quoted. This class should never be instantiated manually, but instead is used internally by the `enumerate` function.

See

`enumerate`

Defined in `packages/data/src/model/enum.ts:13`

`data.Enum.constructor`

constructor

• Private **new Enum()**

Private **constructor** (which should never be called).

Throws

`TypeError`.

Overrides `String.constructor`

Defined in `packages/data/src/model/enum.ts:21`

`data.HasMany`

HasMany

► **HasMany**<T>(typeFactory, transient?): <M>(model: M, field: Field<M>) => void

Model field decorator factory. Using this decorator, Models can be enriched with one-to-many associations to other Models. The value for the `typeFactory` argument has to be another Model. By applying this decorator, the decorated field will (depending on the `transient` argument value) be taken into account when serializing or treemapping the Model containing the decorated field.

Example

Model with a one-to-many association:

```
import { HasMany, Model } from '@sgrud/data';
import { OwnedModel } from './owned-model';

export class ExampleModel extends Model<ExampleModel> {

  @HasMany(() => OwnedModel)
  public field?: OwnedModel[];

  protected [Symbol.toStringTag]: string = 'ExampleModel';
}
```

See

- Model
- HasOne
- Property

Type parameters

Name	Type	Description
T	extends Type<any, T>	Field value constructor type.

Parameters

Name	Type	Default value	Description
typeFactory	() => T	undefined	Forward reference to the field value constructor.
transient	boolean	false	Whether the decorated field is transient.

Returns

 fn

Model field decorator.

► <M>(model, field): void

Type parameters

Name	Type
M	extends Model<any, M>

Parameters

Name	Type
model	M
field	Field<M>

Returns

 void

Defined in packages/data/src/relation/has-many.ts:53

data.HasOne

HasOne

► **HasOne**<T>(typeFactory, transient?): <M>(model: M, field: Field<M>) => void

Model field decorator factory. Using this decorator, Models can be enriched with one-to-one associations to other Models. The value for the typeFactory argument has to be another Model. By applying this decorator, the decorated field will (depending on the transient argument value) be taken into account when serializing or treemapping the Model containing the decorated field.

Example

Model with a one-to-one association:


```
import { HasOne, Model } from '@sgrud/data';
import { OwnedModel } from './owned-model';

export class ExampleModel extends Model<ExampleModel> {

  @HasOne(() => OwnedModel)
  public field?: OwnedModel;

  protected [Symbol.toStringTag]: string = 'ExampleModel';
}
```

See

- Model
- HasMany
- Property

Type parameters

Name	Type	Description
T	extends Type<any, T>	Field value constructor type.

Parameters

Name	Type	Default value	Description
typeFactory	() => T	undefined	Forward reference to the field value constructor.
transient	boolean	false	Whether the decorated field is transient.

Returns

fn

Model field decorator.

► <M>(model, field): void

Type parameters

Name	Type
M	extends Model<any, M>

Parameters

Name	Type
model	M
field	Field<M>

Returns

void

Defined in packages/data/src/relation/has-one.ts:53

data.HttpQuerier

HttpQuerier

• **HttpQuerier**: Object

HTTP based data Querier, i.e., extension of the abstract Querier base class, allowing Model data queries to be committed via HTTP. To use this class, provide it to the Linker by either extending it, and decorating the extending class with the Target decorator, or by preemptively supplying an instance of this class to the Linker.

Example

Provide the **HttpQuerier** to the Linker:

```
import { Linker } from '@sgrud/core';
import { HttpQuerier } from '@sgrud/data';

new Linker<typeof HttpQuerier>([
  HttpQuerier,
  new HttpQuerier('https://api.example.com')
]);
```

See

- Model
- Querier

Defined in packages/data/src/querier/http.ts:33

data.HttpQuerier.provide

provide

■ Static Readonly **provide**: "sgrud.data.querier.Querier"

Magic string by which this class is provided.

See

provide

Inherited from Querier.[provide]

Defined in packages/data/src/querier/querier.ts:105

data.HttpQuerier.commit

commit

► **commit**(operation, variables?): Observable<any>

Overridden **commit** method of the Querier base class. When this Model querier is made available via the Linker, this overridden method is called whenever this querier claims the highest *priority to commit* an Operation, depending on the Model from which the Operation originates.

Throws

Observable of AggregateError.

Parameters

Name	Type	Description
operation	'mutation \${string}' 'query \${string}' 'subscription \${string}'	Querier Operation to be committed.
variables?	Variables	Variables within the Operation.

Returns `Observable<any>`

Observable of the committed Operation.

Overrides `Querier.commit`

Defined in `packages/data/src/querier/http.ts:101`

`data.HttpQuerier.constructor`

constructor

• **new HttpQuerier**(endpoint?, prioritize?)

Public **constructor** consuming the HTTP endpoint Model queries should be fired against, and an dynamic or static prioritize value. The prioritize value may either be a mapping of Models to corresponding priorities or a static priority for this querier.

Parameters

Name	Type	Default value	Description
endpoint	string	undefined	HTTP endpoint to fire Model queries against.
prioritize	number Map<Type<any>, number>	0	Dynamic or static prioritization.

Overrides `Querier.constructor`

Defined in `packages/data/src/querier/http.ts:60`

`data.HttpQuerier.priority`

priority

► **priority**(model): number

Overridden **priority** method of the Querier base class. When an Operation is to be committed, this method is called with the respective model constructor and returns the claimed priority to commit this Model.

Parameters

Name	Type	Description
model	Type<any>	Model to be committed.

Returns `number`

Priority of this implementation.

Overrides `Querier.priority`

Defined in `packages/data/src/querier/http.ts:128`

`data.HttpQuerier.types`

types

- Readonly **types**: Set<Type>

A set containing the the Types this Querier can handle. As HTTP connections are short-lived, this Querier may only handle one-off query Types, namely 'mutation' and 'query'.

Overrides Querier.types

Defined in packages/data/src/querier/http.ts:44

data.HttpQuerier.endpoint

endpoint

- Private Readonly **endpoint**: string

HTTP endpoint to fire Model queries against.

Default Value

new Kernel().endpoint + '/data'

Defined in packages/data/src/querier/http.ts:70

data.HttpQuerier.prioritize

prioritize

- Private Readonly **prioritize**: number | Map<Type<any>, number> = 0

Dynamic or static prioritization.

Default Value

0

Defined in packages/data/src/querier/http.ts:77

data.Model

Model

- Abstract **Model**<M>: Object

Abstract base class to implement data **Models**. By extending this abstract base class while providing the enforced symbol property containing the singular name of the resulting data **Model**, type safe data handling, i.e., retrieval, mutation and storage, can easily be achieved. Through the use of the static- and instance-scoped polymorphic this, all inherited operations warrant type safety and provide intellisense.

Example

Extend the *Model* base class:

```
import { Model, Property } from '@sgrud/data';

export class ExampleModel extends Model<ExampleModel> {

  @Property(() => String)
  public field: string?;

  protected [Symbol.toStringTag]: string = 'ExampleModel';
}
```

See

Querier

Type parameters

Name	Type	Description
M	extends Model = any	Extending <i>Model</i> instance type.

Defined in packages/data/src/model/model.ts:20

packages/data/src/model/model.ts:136

packages/data/src/model/model.ts:341

data.Model.commit

commit

► Static **commit**<T>(this, operation, variables?): Observable<any>

Static **commit** method. Calling this method on a class extending the abstract *Model* base class, while supplying an operation and all its embedded variables, will dispatch the supplied Operation to the respective *Model* repository through the highest priority Querier or, if no Querier is compatible, throw an error. This method is the central point of origin for all *Model*-related data transferral and is internally called by all other distinct methods of the *Model*.

Throws

Observable of ReferenceError.

Example

Commit a query-type operation:

```
import { ExampleModel } from './example-model';

ExampleModel.commit(`query queryExample(variable: $variable) {
  result {
    field
  }
}`, {
  variable: 'value'
}).subscribe(console.log);
```

Type parameters

Name	Type	Description
T	extends Model<any, T>	Extending <i>Model</i> instance type.

Parameters

Name	Type	Description
this operation	Type<T> 'mutation \${string}' 'query \${string}' 'subscription \${string}'	Static polymorphic this. Operation to commit .
variables?	Variables	Variables within the operation.

Returns Observable<any>

Observable of the **commitment**.

Defined in packages/data/src/model/model.ts:379

data.Model.deleteAll

deleteAll

► Static **deleteAll**<T>(this, uuids): Observable<any>

Static **deleteAll** method. Calling this method on a class extending the *Model*, while supplying a list of uuids, will dispatch the deletion of all *Model* instances identified by these UUIDs to the respective *Model* repository by internally calling the *commit* operation with suitable arguments. Through this method, bulk-deletions from the respective *Model* repository can be achieved.

Example

Drop all model instances by UUIDs:

```
import { ExampleModel } from './example-model';
```

```
ExampleModel.deleteAll([  
  'b050d63f-cede-46dd-8634-a80d0563ead8',  
  'a0164132-cd9b-4859-927e-ba68bc20c0ae',  
  'b3fca31e-95cd-453a-93ae-969d3b120712'  
]).subscribe(console.log);
```

Type parameters

Name	Type	Description
T	extends Model<any, T>	Extending <i>Model</i> instance type.

Parameters

Name	Type	Description
this uuids	Type<T> string[]	Static polymorphic this. UUIDs of <i>Model</i> instances to be deleted.

Returns

 Observable<any>

Observable of the deletion.

Defined in packages/data/src/model/model.ts:432

data.Model.deleteOne

deleteOne

► Static **deleteOne**<T>(this, uuid): Observable<any>

Static **deleteOne** method. Calling this method on a class extending the *Model*, while supplying an uuid, will dispatch the deletion of the *Model* instance identified by this UUID to the respective *Model* repository by internally calling the *commit* operation with suitable arguments. Through this method, the deletion of a single *Model* instance from the respective *Model* repository can be achieved.

Example

Drop one model instance by UUID:

```
import { ExampleModel } from './example-model';
```

```
ExampleModel.deleteOne(  
  '18f3aa99-afa5-40f4-90c2-71a2ecc25651'  
).subscribe(console.log);
```

Type parameters

Name	Type	Description
T	extends <i>Model</i> <any, T>	Extending <i>Model</i> instance type.

Parameters

Name	Type	Description
this uuid	Type<T> string	Static polymorphic this. UUID of the <i>Model</i> instance to be deleted.

Returns

Observable<any>

Observable of the deletion.

Defined in

packages/data/src/model/model.ts:468

data.Model.findAll

findAll

► Static **findAll**<T>(this, filter, graph): Observable<{ result: T[]; total: number }>

Static **findAll** method. Calling this method on a class extending the abstract *Model* base class, while supplying a filter to match *Model* instances by and a graph containing the fields to be included in the result, will dispatch a lookup operation to the respective *Model* repository by internally calling the *commit* operation with suitable arguments. Through this method, the bulk-lookup of *Model* instances from the respective *Model* repository can be achieved.

Example

Lookup all UUIDs for model instances modified between two dates:

```
import { ExampleModel } from './example-model';
```

```
ExampleModel.findAll({
  expression: {
    conjunction: {
      operands: [
        {
          entity: {
            operator: 'GREATER_OR_EQUAL',
            path: 'modified',
            value: new Date('2021-01-01')
          }
        },
        {
          entity: {
            operator: 'LESS_OR_EQUAL',
            path: 'modified',
            value: new Date('2021-12-12')
          }
        }
      ],
      operator: 'AND'
    }
  }, [
    'id',
    'field'
  ]).subscribe(console.log);
```

Type parameters

Name	Type	Description
T	extends <code>Model<any, T></code>	Extending <i>Model</i> instance type.

Parameters

Name	Type	Description
this	<code>Type<T></code>	Static polymorphic this.
filter	<code>Filter<T></code>	Filter to find <i>Model</i> instances by.
graph	<code>Graph<T></code>	Graph of fields to be included.

Returns

`Observable<{ result: T[]; total: number }>`

Observable of the find operation.

Defined in

`packages/data/src/model/model.ts:531`

`data.Model.findOne`

findOne

► Static **findOne**`<T>(this, shape, graph): Observable<T>`

Static **findOne** method. Calling this method on a class extending the abstract *Model* base class, while supplying the shape to match the *Model* instance by and a graph describing the fields to be included in the result, will dispatch the lookup operation to the respective *Model* repository by internally calling the *commit* operation with suitable arguments. Through this method, the retrieval of one specific *Model* instance from the respective *Model* repository can be achieved.

Example

Lookup one model instance by UUID:

```
import { ExampleModel } from './example-model';

ExampleModel.findOne({
  id: '2cfe7609-c4d9-4e4f-9a8b-ad72737db48a'
}, [
  'id',
  'modified',
  'field'
]).subscribe(console.log);
```

Type parameters

Name	Type	Description
T	extends <code>Model<any, T></code>	Extending <i>Model</i> instance type.

Parameters

Name	Type	Description
this	<code>Type<T></code>	Static polymorphic this.
shape	<code>Shape<T></code>	Shape of the <i>Model</i> instance to find.
graph	<code>Graph<T></code>	Graph of fields to be included.

Returns

`Observable<T>`

Observable of the find operation.

Defined in packages/data/src/model/model.ts:583

data.Model.saveAll

saveAll

► Static **saveAll**<T>(this, models, graph): Observable<T[]>

Static **saveAll** method. Calling this method on a class extending the abstract *Model* base class, while supplying a list of models which to save and a graph describing the fields to be included in the result, will dispatch the save operation to the respective *Model* repository by internally calling the *commit* operation with suitable arguments. Through this method, bulk-persistence of *Model* instances from the respective *Model* repository can be achieved.

Example

Persist multiple *Models*:

```
import { ExampleModel } from './example-model';

ExampleModel.saveAll([
  new ExampleModel({ field: 'example_1' }),
  new ExampleModel({ field: 'example_2' }),
  new ExampleModel({ field: 'example_3' })
], [
  'id',
  'modified',
  'field'
]).subscribe(console.log);
```

Type parameters

Name	Type	Description
T	extends Model<any, T>	Extending <i>Model</i> instance type.

Parameters

Name	Type	Description
this	Type<T>	Static polymorphic this.
models	T[]	Array of <i>Models</i> to be saved.
graph	Graph<T>	Graph of fields to be included.

Returns Observable<T[]>

Observable of the save operation.

Defined in packages/data/src/model/model.ts:632

data.Model.saveOne

saveOne

► Static **saveOne**<T>(this, model, graph): Observable<T>

Static **saveOne** method. Calling this method on a class extending the abstract *Model* base class, while supplying a model which to save and a graph describing the fields to be included in the result, will dispatch the save operation to the respective *Model* repository by internally calling the *commit* operation with suitable arguments. Through this method, persistence of one specific *Model* instance from the respective *Model* repository can be achieved.

Example

Persist a model:

```
import { ExampleModel } from './example-model';

ExampleModel.saveOne(new ExampleModel({ field: 'example' })), [
  'id',
  'modified',
  'field'
]).subscribe(console.log);
```

Type parameters

Name	Type	Description
T	extends Model<any, T>	Extending <i>Model</i> instance type.

Parameters

Name	Type	Description
this	Type<T>	Static polymorphic this.
model	T	<i>Model</i> which is to be saved.
graph	Graph<T>	Graph of fields to be included.

Returns

Observable<T>

Observable of the save operation.

Defined in

packages/data/src/model/model.ts:677

data.Model.serialize

serialize

► Static **serialize**<T>(this, model, shallow?): undefined | Shape<T>

Static **serialize** method. Calling this method on a class extending the *Model*, while supplying a model which to **serialize** and optionally enabling shallow serialization, will return the Shape of the *Model*, i.e., a plain JSON representation of all *Model* fields, or undefined, if the supplied model does not contain any fields or values. By serializing shallowly, only properties defined on the supplied model are included (which means, all one-to-one and one-to-many associations are ignored). Through this method, the serialization of one specific *Model* instance from the respective *Model* repository can be achieved.

Example

Serialize a model:

```
import { ExampleModel } from './example-model';

const model = new ExampleModel({ field: 'example' });
const shape = ExampleModel.serialize(model);
console.log(shape); // { field: 'example' }
```

Type parameters

Name	Type	Description
T	extends Model<any, T>	Extending <i>Model</i> instance type.

Parameters

Name	Type	Default value	Description
this	Type<T>	undefined	Static polymorphic this.

Name	Type	Default value	Description
model	T	undefined	<i>Model</i> which is to be serialized .
shallow	boolean	false	Whether to serialize shallowly.

Returns undefined | Shape<T>

Shape of the *Model* or undefined.

Defined in packages/data/src/model/model.ts:721

data.Model.treemap

treemap

► Static **treemap**<T>(this, model, shallow?): undefined | Graph<T>

Static **treemap** method. Calling this method on a class extending the abstract *Model* base class, while supplying a model which to **treemap** and optionally enabling shallow **treemapping**, will return a Graph describing the fields which are declared and defined on the supplied model, or undefined, if the supplied model does not contain any fields or values. By **treemapping** shallowly, only properties defined on the supplied model are included (which means, all one-to-one and one-to-many associations are ignored). Through this method, the Graph for one specific *Model* instance from the respective *Model* repository can be retrieved.

Example

Treemap a *Model*:

```
import { ExampleModel } from './example-model';

const model = new ExampleModel({ field: 'example' });
const graph = ExampleModel.treemap(model);
console.log(graph); // ['field']
```

Type parameters

Name	Type	Description
T	extends Model<any, T>	Extending <i>Model</i> instance type.

Parameters

Name	Type	Default value	Description
this	Type<T>	undefined	Static polymorphic this.
model	T	undefined	<i>Model</i> which is to be treemapped .
shallow	boolean	false	Whether to treemap shallowly.

Returns undefined | Graph<T>

Graph of the *Model* or undefined.

Defined in packages/data/src/model/model.ts:792

data.Model.unravel

unravel

► Static **unravel**<T>(this, graph): string

Static **unravel** method. Calling this method on a class extending the abstract *Model* base class, while supplying a graph describing the fields which to **unravel**, will return the **unraveled** Graph as raw string. Through this method, the Graph for one specific *Model* instance from the respective *Model* repository can be **unraveled** into a raw string. This **unraveled** Graph can then be consumed by, e.g., the *commit* method.

Example

Unravel a Graph:

```
import { ExampleModel } from './example-model';

const unraveled = ExampleModel.unravel([
  'id',
  'modified',
  'field'
]);

console.log(unraveled); // '{id modified field}'
```

Type parameters

Name	Type	Description
T	extends <i>Model</i> <any, T>	Extending <i>Model</i> instance type.

Parameters

Name	Type	Description
this graph	Type<T> Graph<T>	Static polymorphic this. Graph which is to be unraveled .

Returns

 string

Unraveled Graph as raw string.

Defined in packages/data/src/model/model.ts:859

data.Model.valuate

valuate

► Static **valuate**<T>(this, model, field): any

Static **valuate** method. Calling this method on a class extending the abstract *Model* base class, while supplying a model and a field which to **valuate**, will return the preprocessed value (e.g., primitive representation of JavaScript Dates) of the supplied field of the supplied model. Through this method, the preprocessed field value of one specific *Model* instance from the respective *Model* repository can be retrieved.

Example

Valuate a field:

```
import { ExampleModel } from './example-model';

const model = new ExampleModel({ created: new Date(0) });
const value = ExampleModel.valuate(model, 'created');
console.log(value); // '1970-01-01T00:00:00.000+00:00'
```

Type parameters

Name	Type	Description
T	extends Model<any, T>	Extending <i>Model</i> instance type.

Parameters

Name	Type	Description
this	Type<T>	Static polymorphic this.
model	T	<i>Model</i> which is to be valuated .
field	Field<T>	Field of the <i>Model</i> to be valuated .

Returns

any

Valuated field value.

Defined in packages/data/src/model/model.ts:931

data.Model.hasMany

hasMany

- Optional Readonly **hasMany**: Record<keyof M, () => unknown>

Symbol property used by the HasMany decorator.

Defined in packages/data/src/model/model.ts:991

data.Model.hasOne

hasOne

- Optional Readonly **hasOne**: Record<keyof M, () => unknown>

Symbol property used by the HasOne decorator.

Defined in packages/data/src/model/model.ts:984

data.Model.observable

observable

- Readonly **observable**: () => Subscribable<M>

Type declaration ▶ (): Subscribable<M>

Symbol property typed as callback to a Subscribable. The returned Subscribable emits every mutation this *Model* instance experiences.

Example

Subscribe to a *Model* instance:

```
import { from } from 'rxjs';
import { ExampleModel } from './example-model';

const model = new ExampleModel();
from(model).subscribe(console.log);
```

Returns Subscribable<M>

Callback to a Subscribable.

Defined in packages/data/src/model/model.ts:1018

data.Model.property

property

- Optional Readonly **property**: Record<keyof M, () => unknown>

Symbol property used by the Property decorator.

Defined in packages/data/src/model/model.ts:998

data.Model.assign

assign

► **assign**<T>(this, ...parts): Observable<T>

Instance-scoped **assign** method. Calling this method, while supplying a list of parts, will **assign** all supplied parts to the *Model* instance. The **assignment** is implemented as deep merge **assignment**. Using this method, an existing *Model* instance can easily be mutated while still emitting the mutated *changes*.

Example

Assign parts to a *Model* instance:

```
import { ExampleModel } from './example-model';

const model = new ExampleModel();
model.assign({ field: 'example' }).subscribe(console.log);
```

Type parameters

Name	Type	Description
T	extends Model<any, T> = M	Extending <i>Model</i> instance type.

Parameters

Name	Type	Description
this ...parts	T Shape<T>[]	Polymorphic this. Array of parts to assign .

Returns Observable<T>

Observable of the mutated instance.

Defined in packages/data/src/model/model.ts:1130

data.Model.clear

clear

► **clear**<T>(this, keys?): Observable<T>

Instance-scoped **clear** method. Calling this method on an instance of a class extending the abstract *Model* base class, while optionally supplying a list of keys which are to be **cleared**, will set the value of the properties described by either the supplied keys or, if no keys were supplied, all enumerable properties of the class extending the abstract *Model* base class to undefined, effectively **clearing** them.

Example

Clear a *Model* instance selectively:

```
import { ExampleModel } from './example-model';

const model = new ExampleModel({ field: 'example' });
model.clear(['field']).subscribe(console.log);
```

Type parameters

Name	Type	Description
T	extends Model<any, T> = M	Extending <i>Model</i> instance type.

Parameters

Name	Type	Description
this keys?	T Field<T>[]	Polymorphic this. Optional array of keys to clear .

Returns

Observable<T>
Observable of the mutated instance.

Defined in packages/data/src/model/model.ts:1163

data.Model.commit

commit

► **commit**<T>(this, operation, variables?, mapping?): Observable<T>

Instance-scoped **commit** method. Internally calls the static *commit* method on the *this*-context of an instance of a class extending the abstract *Model* base class and furthermore *assigns* the returned data to the *Model* instance the **commit** method was called upon. When supplying a mapping, the returned data will be mutated by the supplied OperatorFunction (otherwise this mapping defaults to identity).

Example

Commit a query-type operation:

```
import { ExampleModel } from './example-model';

const model = new ExampleModel();

model.commit(`query queryExample(variable: $variable) {
  result {
    field
  }
}`, {
  variable: 'value'
}).subscribe(console.log);
```

Type parameters

Name	Type	Description
T	extends Model<any, T> = M	Extending <i>Model</i> instance type.

Parameters

Name	Type	Default value	Description
this	T	undefined	Polymorphic this.

Name	Type	Default value	Description
operation	'mutation \${string}' 'query \${string}' 'subscription \${string}'	undefined	Operation to commit .
variables?	Variables	undefined	Variables within the operation.
mapping	OperatorFunction<any, Shape<T>>	identity	OperatorFunction to apply.

Returns

Observable<T>

Observable of the mutated instance.

Defined in

packages/data/src/model/model.ts:1223

data.Model.constructor

constructor

• **new Model**<M>(...parts)

Public **constructor**. The **constructor** of all classes extending the abstract *Model* base class, unless explicitly overridden, behaves analogous to the instance-scoped *assign* method, as it takes all supplied parts and assigns them to the instantiated and returned *Model*. The **constructor** furthermore wires some internal functionality, e.g., creates a new *changes* BehaviorSubject which emits every mutation this *Model* instance experiences.

Type parameters

Name	Type
M	extends Model<any, M> = any

Parameters

Name	Type	Description
...parts	Shape<M>[]	Array of parts to assign.

Defined in

packages/data/src/model/model.ts:1101

data.Model.created

created

• Optional **created**: Date

Transient creation date of this *Model* instance.

Defined in

packages/data/src/model/model.ts:1030

data.Model.delete

delete

► **delete**<T>(this): Observable<T>

Instance-scoped **delete** method. Internally calls the static *deleteOne* method while supplying the UUID of this instance of a class extending the abstract *Model* base class. Calling this method furthermore *clears* the *Model* instance and completes its deletion by calling *complete* on the internal *changes* BehaviorSubject of the *Model* instance the **delete** method was called upon.

Example

Drop a *Model* instance by UUID:

```
import { ExampleModel } from './example-model';

const model = new ExampleModel({
  id: '3068b30e-82cd-44c5-8912-db13724816fd'
});

model.delete().subscribe(console.log);
```

Type parameters

Name	Type	Description
T	extends Model<any, T> = M	Extending <i>Model</i> instance type.

Parameters

Name	Type	Description
this	T	Polymorphic this.

Returns Observable<T>

Observable of the mutated instance.

Defined in packages/data/src/model/model.ts:1262

data.Model.find

find

► **find**<T>(this, graph, shape?): Observable<T>

Instance-scoped **find** method. Internally calls the static *findOne* method on the *this*-context of an instance of a class extending the abstract *Model* base class and then *assigns* the returned data to the *Model* instance the **find** method was called upon.

Example

Find a *Model* instance by UUID:

```
import { ExampleModel } from './example-model';

const model = new ExampleModel({
  id: '3068b30e-82cd-44c5-8912-db13724816fd'
});

model.find([
  'id',
  'modified',
  'field'
]).subscribe(console.log);
```

Type parameters

Name	Type	Description
T	extends <code>Model<any, T> = M</code>	Extending <i>Model</i> instance type.

Parameters

Name	Type	Description
this	T	Polymorphic this.
graph	<code>Graph<T></code>	Graph of fields to be included.
shape	<code>Shape<T></code>	Shape of the <i>Model</i> to find.

Returns

`Observable<T>`

Observable of the mutated instance.

Defined in

`packages/data/src/model/model.ts:1303`

`data.Model.id`

id

- Optional **id**: string

Universally unique identifier of this *Model* instance.

Defined in

`packages/data/src/model/model.ts:1024`

`data.Model.modified`

modified

- Optional **modified**: Date

Transient modification date of this *Model* instance.

Defined in

`packages/data/src/model/model.ts:1036`

`data.Model.save`

save

► **save**<T>(this, graph?): `Observable<T>`

Instance-scoped **save** method. Internally calls the static *saveOne* method on the *this*-context of an instance of a class extending the abstract *Model* base class and then *assigns* the returned data to the *Model* instance the **save** method was called upon.

Example

Persist a *Model* instance:

```
import { ExampleModel } from './example-model';

const model = new ExampleModel({ field: 'example' });

model.save([
  'id',
  'modified',
  'field'
]).subscribe(console.log);
```

Type parameters

Name	Type	Description
T	extends <code>Model<any, T> = M</code>	Extending <i>Model</i> instance type.

Parameters

Name	Type	Description
this graph	T Graph<T>	Polymorphic this. Graph of fields to be included.

Returns

`Observable<T>`

Observable of the mutated instance.

Defined in `packages/data/src/model/model.ts:1340`

`data.Model.serialize`

serialize

► **serialize**<T>(this, shallow?): undefined | Shape<T>

Instance-scoped **serialize** method. Internally calls the static *serialize* method on the *this*-context of an instance of a class extending the abstract *Model* base class.

Example

Serialize a *Model* instance:

```
import { ExampleModel } from './example-model';

const model = new ExampleModel({ field: 'example' });
console.log(model.serialize()); // { field: 'example' }
```

Type parameters

Name	Type	Description
T	extends <code>Model<any, T> = M</code>	Extending <i>Model</i> instance type.

Parameters

Name	Type	Default value	Description
this shallow	T boolean	undefined false	Polymorphic this. Whether to serialize shallowly.

Returns

`undefined | Shape<T>`

Shape of this instance or undefined.

Defined in `packages/data/src/model/model.ts:1370`

`data.Model.treemap`

treemap

► **treemap**<T>(this, shallow?): undefined | Graph<T>

Instance-scoped **treemap** method. Internally calls the static *treemap* method on the *this*-context of an instance of a class extending the abstract *Model* base class.

Example

Treemap a *Model* instance:

```
import { ExampleModel } from './example-model';

const model = new ExampleModel({ field: 'example' });
console.log(model.treemap()); // ['field']
```

Type parameters

Name	Type	Description
T	extends Model<any, T> = M	Extending <i>Model</i> instance type.

Parameters

Name	Type	Default value	Description
this	T	undefined	Polymorphic this.
shallow	boolean	false	Whether to treemap shallowly.

Returns undefined | Graph<T>

Graph of this instance or undefined.

Defined in packages/data/src/model/model.ts:1398

data.Model.[toStringTag]

[toStringTag]

• Protected Readonly Abstract **[toStringTag]**: string

Enforced symbol property containing the singular name of this *Model*. The value of this property represents the repository which all instances of this *Model* are considered to belong to. In Detail, the different operations *committed* through this *Model* are derived from this singular name (and the corresponding pluralized form).

Example

Provide a valid symbol property:

```
import { Model } from '@sgrud/data';

export class ExampleModel extends Model<ExampleModel> {
  protected [Symbol.toStringTag]: string = 'ExampleModel';
}
```

Defined in packages/data/src/model/model.ts:977

data.Model.changes

changes

• Protected Readonly **changes**: BehaviorSubject<M>

BehaviorSubject emitting every time this *Model* instance experiences **changes**.

Defined in packages/data/src/model/model.ts:1044

data.Model.entity

entity

- Protected get **entity**(): string

Accessor to the singular name of this *Model*.

Returns string

Singular name of this *Model*.

Defined in packages/data/src/model/model.ts:1066

data.Model.plural

plural

- Protected get **plural**(): string

Accessor to the **pluralized** name of this *Model*.

Returns string

Pluralized name of this *Model*.

Defined in packages/data/src/model/model.ts:1075

data.Model.static

static

- Protected Readonly **static**: Type<M>

Type-asserted alias for the **static** *Model* context.

Defined in packages/data/src/model/model.ts:1049

data.Model.type

type

- Protected get **type**(): string

Accessor to the raw name of this *Model*.

Returns string

Raw name of this *Model*.

Defined in packages/data/src/model/model.ts:1084

data.Model

Model

• **Model:** Object

Namespace containing types and interfaces used and intended to be used in conjunction with classes extending the abstract Model base class. All the types and interfaces within this namespace are only applicable to classes extending the abstract Model base class, as their generic type argument is always constrained to this abstract base class.

See

Model

Defined in packages/data/src/model/model.ts:20

packages/data/src/model/model.ts:136

packages/data/src/model/model.ts:341

data.Model.Field

Field

T **Field**<T>: string & Exclude<keyof T, Exclude<keyof Model, "id" | "created" | "modified">>

Type alias for all **Fields**, i.e., own enumerable properties, (excluding internally used ones) of classes extending the abstract Model base class.

Type parameters

Name	Type	Description
T	extends Model	Extending <i>Model</i> instance type.

Defined in packages/data/src/model/model.ts:32

data.Model.Filter

Filter

T **Filter**<T>: Params<T>

Type alias referencing **Filter** Params.

See

Params

Type parameters

Name	Type	Description
T	extends Model	Extending <i>Model</i> instance type.

Defined in packages/data/src/model/model.ts:45

packages/data/src/model/model.ts:136

data.Model.Filter

Filter

- **Filter**: Object

Namespace containing types and interfaces to be used when searching through the repositories of classes extending the abstract Model base class. All the interfaces within this namespace are only applicable to classes extending the abstract Model base class, as their generic type argument is always constrained to this abstract base class.

See

Model

Defined in packages/data/src/model/model.ts:45

packages/data/src/model/model.ts:136

Model.Filter.Conjunction

Conjunction

T **Conjunction**: "AND" | "AND_NOT" | "OR" | "OR_NOT"

Type alias for a string union type of all possible **Conjunctions**, namely: 'AND', 'AND_NOT', 'OR' and 'OR_NOT'.

Defined in packages/data/src/model/model.ts:142

Model.Filter.Expression

Expression

- **Expression**<T>: Object

Interface describing the shape of an **Expression** which may be employed through the Params as part of a *findAll* invocation of the Model. **Expressions** can either be the plain shape of an *entity* or compositions of multiple filter expressions, conjunct by one of the Conjunctions.

Type parameters

Name	Type	Description
T	extends Model	Extending <i>Model</i> instance type.

Defined in packages/data/src/model/model.ts:175

Filter.Expression.conjunction

conjunction

- Optional Readonly **conjunction**: Object

Conjunction of multiple filter expressions requested data Models are matched against. The *conjunction* sibling parameter has to be undefined when supplying this parameter. By supplying filter expressions, conjunct by specific Conjunction operators, fine-grained filter operations can be compiled.

Type declaration

Name	Type	Description
operands	Expression<T>[]	List of expressions which are logically combined through an <i>operator</i> . These expressions may be nested and can be used to construct complex composite filter operations.
operator?	Conjunction	Conjunction operator used to logically combine all supplied <i>operands</i> . Conjunction: https://sgrud.github.io/client/types/data.Model-1.Filter-1.Conjunction

Defined in packages/data/src/model/model.ts:187

Filter.Expression.entity

entity

- Optional Readonly **entity**: Object

Shape the requested data Models are matched against. Supplying this parameter requires the *conjunction* sibling parameter to be undefined. By specifying the **entity** shape to match data Models against, simple filter operations can be compiled.

Type declaration

Name	Type	Description
operator?	Operator	[Operator][] to use for matching. [Operator]: https://sgrud.github.io/client/types/data.Model-1.Filter-1.Operator
path	Path<T, []>	Property path from within the data Model which to match against. The value which will be matched against has to be supplied through the <i>value</i> property. Model: https://sgrud.github.io/client/classes/data.Model
value	unknown	Property value to match data Models against. The property path of this value has to be supplied through the <i>path</i> property. Model: https://sgrud.github.io/client/classes/data.Model

Defined in packages/data/src/model/model.ts:214

Model.Filter.Operator

Operator

T **Operator**: "EQUAL" | "GREATER_OR_EQUAL" | "GREATER_THAN" | "LESS_OR_EQUAL" | "LESS_THAN" | "LIKE" | "NOT_EQUAL"

Type alias for a string union type of all possible **Operators**, namely: 'EQUAL', 'NOT_EQUAL', 'LIKE', 'GREATER_THAN', 'GREATER_OR_EQUAL', 'LESS_THAN' and 'LESS_OR_EQUAL'.

Defined in packages/data/src/model/model.ts:153

Model.Filter.Params

Params

- **Params**<T>: Object

Interface describing the **Params** of, e.g., the Model *findAll* method. This is the most relevant interface within this namespace (and is therefore also referenced by the Filter type alias), as it describes the input **Params** of any selective data retrieval.

See

Model

Type parameters

Name	Type	Description
T	extends Model	Extending <i>Model</i> instance type.

Defined in packages/data/src/model/model.ts:257

Filter.Params.dir

dir

- Optional Readonly **dir**: "desc" | "asc"

Desired sorting **direction** of the requested data Models. To specify which field the results should be sorted by, the *sort* property must be supplied.

Defined in packages/data/src/model/model.ts:266

Filter.Params.expression

expression

- Optional Readonly **expression**: Expression<T>

Expression to evaluate results against. This **expression** may be a simple matching or more complex, conjunct and nested **expressions**.

Defined in packages/data/src/model/model.ts:272

Filter.Params.page

page

- Optional Readonly **page**: number

Page number, i.e., offset within the list of all results for a data Model request. This property should be used together with the *page size* property.

Defined in packages/data/src/model/model.ts:281

Filter.Params.search

search

- Optional Readonly **search**: string

Free-text **search** field. This field overrides all *expressions*, as such that if this field contains a value, all *expressions* are ignored and only this free-text **search** filter is applied.

Defined in packages/data/src/model/model.ts:288

Filter.Params.size

size

- Optional Readonly **size**: number

Page **size**, i.e., number of results which should be included within the response to a data Model request. This property should be used together with the *page* offset property.

Defined in packages/data/src/model/model.ts:297

Filter.Params.sort

sort

- Optional Readonly **sort**: Path<T, []>

Property path used to determine the value which to **sort** the requested data Models by. This property should be used together with the sorting *direction* property.

Defined in packages/data/src/model/model.ts:306

data.Model.Graph

Graph

T **Graph**<T>: { [K in Field<T>]?: Required<T>[K] extends Function ? never : Required<T>[K] extends Model<infer I> | Model<infer I>[] ? Record<K, Graph<I> | Function> : K }[Field<T>][]

Mapped type to compile strongly typed **Graphs** of classes extending the abstract Model base class, while providing intellisense.

Type parameters

Name	Type	Description
T	extends Model	Extending <i>Model</i> instance type.

Defined in packages/data/src/model/model.ts:55

data.Model.Path

Path

T **Path**<T, S>: { [K in Field<T>]: S extends Object ? never : Required<T>[K] extends Function ? never : Required<T>[K] extends Model<infer I> | Model<infer I>[] ? `\${K}.\${Path<I, [...S, string]>}` : K }[Field<T>]

Mapped type to compile strongly typed property **Paths** of classes extending the abstract Model base class, while providing intellisense.

Type parameters

Name	Type	Description
T	extends Model	Extending <i>Model</i> instance type.
S	extends string[] = []	String array type.

Defined in packages/data/src/model/model.ts:73

data.Model.Shape

Shape

T Shape<T>: { [K in Field<T>]?: Required<T>[K] extends Function ? never : Required<T>[K] extends Model<infer I> ? Shape<I> : Required<T>[K] extends Model<infer I>[] ? Shape<I>[] : Required<T>[K]

Mapped type to compile strongly typed **Shapes** of classes extending the abstract *Model* base class, while providing intellisense.

Type parameters

Name	Type	Description
T	extends Model	Extending <i>Model</i> instance type.

Defined in packages/data/src/model/model.ts:92

data.Model.Type

Type

• **Type<T>**: Object

Interface describing the **Type**, i.e., static constructable context, of classes extending the abstract *Model* base class.

Type parameters

Name	Type	Description
T	extends Model	Extending <i>Model</i> instance type.

Defined in packages/data/src/model/model.ts:111

Model.Type.commit

commit

► **commit<T>**(this, operation, variables?): Observable<any>

Static **commit** method. Calling this method on a class extending the abstract *Model* base class, while supplying an operation and all its embedded variables, will dispatch the supplied Operation to the respective *Model* repository through the highest priority Querier or, if no Querier is compatible, throw an error. This method is the central point of origin for all *Model*-related data transferral and is internally called by all other distinct methods of the *Model*.

Throws

Observable of ReferenceError.

Example

Commit a query-type operation:

```
import { ExampleModel } from './example-model';

ExampleModel.commit(`query queryExample(variable: $variable) {
  result {
    field
  }
}
```

```

}`, {
  variable: 'value'
}).subscribe(console.log);

```

Type parameters

Name	Type	Description
T	extends <code>Model<any, T></code>	Extending <i>Model</i> instance type.

Parameters

Name	Type	Description
this operation	<code>Type<T></code> <code>'mutation \${string}' 'query \${string}' 'subscription \${string}'</code>	Static polymorphic this. Operation to commit .
variables?	<code>Variables</code>	Variables within the operation.

Returns

`Observable<any>`

Observable of the **commitment**.

Inherited from

`Required.commit`

Defined in

`packages/data/src/model/model.ts:379`

`Model.Type.constructor`

constructor

• **new** `Type(...args)`

Overridden and concretized constructor signature.

Parameters

Name	Type	Description
<code>...args</code>	<code>Shape<Model<any>>[]</code>	Class constructor rest parameter.

Inherited from

`Required<typeof Model>.constructor`

Defined in

`packages/data/src/model/model.ts:118`

`Model.Type.deleteAll`

deleteAll

► **deleteAll**`<T>(this, uuids): Observable<any>`

Static **deleteAll** method. Calling this method on a class extending the *Model*, while supplying a list of uuids, will dispatch the deletion of all *Model* instances identified by these UUIDs to the respective *Model* repository by internally calling the *commit* operation with suitable arguments. Through this method, bulk-deletions from the respective *Model* repository can be achieved.

Example

Drop all model instances by UUIDs:

```
import { ExampleModel } from './example-model';
```

```
ExampleModel.deleteAll([
  'b050d63f-cede-46dd-8634-a80d0563ead8',
  'a0164132-cd9b-4859-927e-ba68bc20c0ae',
  'b3fca31e-95cd-453a-93ae-969d3b120712'
]).subscribe(console.log);
```

Type parameters

Name	Type	Description
T	extends Model<any, T>	Extending <i>Model</i> instance type.

Parameters

Name	Type	Description
this uuids	Type<T> string[]	Static polymorphic this. UUIDs of <i>Model</i> instances to be deleted.

Returns

Observable of the deletion.

Inherited from

Required.deleteAll

Defined in

packages/data/src/model/model.ts:432

Model.Type.deleteOne

deleteOne

► **deleteOne**<T>(this, uuid): Observable<any>

Static **deleteOne** method. Calling this method on a class extending the *Model*, while supplying an uuid, will dispatch the deletion of the *Model* instance identified by this UUID to the respective *Model* repository by internally calling the *commit* operation with suitable arguments. Through this method, the deletion of a single *Model* instance from the respective *Model* repository can be achieved.

Example

Drop one model instance by UUID:

```
import { ExampleModel } from './example-model';
```

```
ExampleModel.deleteOne(
  '18f3aa99-afa5-40f4-90c2-71a2ecc25651'
).subscribe(console.log);
```

Type parameters

Name	Type	Description
T	extends Model<any, T>	Extending <i>Model</i> instance type.

Parameters

Name	Type	Description
this	Type<T>	Static polymorphic this.

Name	Type	Description
uuid	string	UUID of the <i>Model</i> instance to be deleted.

Returns Observable<any>

Observable of the deletion.

Inherited from Required.deleteOne

Defined in packages/data/src/model/model.ts:468

Model.Type.findAll

findAll

► **findAll**<T>(this, filter, graph): Observable<{ result: T[]; total: number }>

Static **findAll** method. Calling this method on a class extending the abstract *Model* base class, while supplying a filter to match *Model* instances by and a graph containing the fields to be included in the result, will dispatch a lookup operation to the respective *Model* repository by internally calling the *commit* operation with suitable arguments. Through this method, the bulk-lookup of *Model* instances from the respective *Model* repository can be achieved.

Example

Lookup all UUIDs for model instances modified between two dates:

```
import { ExampleModel } from './example-model';
```

```
ExampleModel.findAll({
  expression: {
    conjunction: {
      operands: [
        {
          entity: {
            operator: 'GREATER_OR_EQUAL',
            path: 'modified',
            value: new Date('2021-01-01')
          }
        },
        {
          entity: {
            operator: 'LESS_OR_EQUAL',
            path: 'modified',
            value: new Date('2021-12-12')
          }
        }
      ],
      operator: 'AND'
    }
  }, [
    'id',
    'field'
  ]).subscribe(console.log);
```

Type parameters

Name	Type	Description
T	extends Model<any, T>	Extending <i>Model</i> instance type.

Parameters

Name	Type	Description
this	Type<T>	Static polymorphic this.
filter	Filter<T>	Filter to find <i>Model</i> instances by.
graph	Graph<T>	Graph of fields to be included.

Returns Observable<{ result: T[]; total: number }>

Observable of the find operation.

Inherited from Required.findAll

Defined in packages/data/src/model/model.ts:531

Model.Type.findOne

findOne

► **findOne**<T>(this, shape, graph): Observable<T>

Static **findOne** method. Calling this method on a class extending the abstract *Model* base class, while supplying the shape to match the *Model* instance by and a graph describing the fields to be included in the result, will dispatch the lookup operation to the respective *Model* repository by internally calling the *commit* operation with suitable arguments. Through this method, the retrieval of one specific *Model* instance from the respective *Model* repository can be achieved.

Example

Lookup one model instance by UUID:

```
import { ExampleModel } from './example-model';

ExampleModel.findOne({
  id: '2cfe7609-c4d9-4e4f-9a8b-ad72737db48a'
}, [
  'id',
  'modified',
  'field'
]).subscribe(console.log);
```

Type parameters

Name	Type	Description
T	extends Model<any, T>	Extending <i>Model</i> instance type.

Parameters

Name	Type	Description
this	Type<T>	Static polymorphic this.
shape	Shape<T>	Shape of the <i>Model</i> instance to find.
graph	Graph<T>	Graph of fields to be included.

Returns Observable<T>

Observable of the find operation.

Inherited from Required.findOne

Defined in packages/data/src/model/model.ts:583

Model.Type.prototype

prototype

• **prototype**: Model<any>

Inherited from Required.prototype

Model.Type.saveAll

saveAll

► **saveAll**<T>(this, models, graph): Observable<T[]>

Static **saveAll** method. Calling this method on a class extending the abstract *Model* base class, while supplying a list of models which to save and a graph describing the fields to be included in the result, will dispatch the save operation to the respective *Model* repository by internally calling the *commit* operation with suitable arguments. Through this method, bulk-persistence of *Model* instances from the respective *Model* repository can be achieved.

Example

Persist multiple *Models*:

```
import { ExampleModel } from './example-model';

ExampleModel.saveAll([
  new ExampleModel({ field: 'example_1' }),
  new ExampleModel({ field: 'example_2' }),
  new ExampleModel({ field: 'example_3' })
], [
  'id',
  'modified',
  'field'
]).subscribe(console.log);
```

Type parameters

Name	Type	Description
T	extends Model<any, T>	Extending <i>Model</i> instance type.

Parameters

Name	Type	Description
this	Type<T>	Static polymorphic this.
models	T[]	Array of <i>Models</i> to be saved.
graph	Graph<T>	Graph of fields to be included.

Returns Observable<T[]>

Observable of the save operation.

Inherited from Required.saveAll

Defined in packages/data/src/model/model.ts:632

Model.Type.saveOne

saveOne

► **saveOne**<T>(this, model, graph): Observable<T>

Static **saveOne** method. Calling this method on a class extending the abstract *Model* base class, while supplying a model which to save and a graph describing the fields to be included in the result, will dispatch the save operation to the respective *Model* repository by internally calling the *commit* operation with suitable arguments. Through this method, persistence of one specific *Model* instance from the respective *Model* repository can be achieved.

Example

Persist a model:

```
import { ExampleModel } from './example-model';

ExampleModel.saveOne(new ExampleModel({ field: 'example' })), [
  'id',
  'modified',
  'field'
]).subscribe(console.log);
```

Type parameters

Name	Type	Description
T	extends Model<any, T>	Extending <i>Model</i> instance type.

Parameters

Name	Type	Description
this	Type<T>	Static polymorphic this.
model	T	<i>Model</i> which is to be saved.
graph	Graph<T>	Graph of fields to be included.

Returns

 Observable<T>

Observable of the save operation.

Inherited from

 Required.saveOne

Defined in

 packages/data/src/model/model.ts:677

Model.Type.serialize

serialize

► **serialize**<T>(this, model, shallow?): undefined | Shape<T>

Static **serialize** method. Calling this method on a class extending the *Model*, while supplying a model which to **serialize** and optionally enabling shallow serialization, will return the Shape of the *Model*, i.e., a plain JSON representation of all *Model* fields, or undefined, if the supplied model does not contain any fields or values. By serializing shallowly, only properties defined on the supplied model are included (which means, all one-to-one and one-to-many associations are ignored). Through this method, the serialization of one specific *Model* instance from the respective *Model* repository can be achieved.

Example

Serialize a model:

```
import { ExampleModel } from './example-model';

const model = new ExampleModel({ field: 'example' });
const shape = ExampleModel.serialize(model);
console.log(shape); // { field: 'example' }
```

Type parameters

Name	Type	Description
T	extends <i>Model</i> <any, T>	Extending <i>Model</i> instance type.

Parameters

Name	Type	Default value	Description
this	Type<T>	undefined	Static polymorphic this.
model	T	undefined	<i>Model</i> which is to be serialized .
shallow	boolean	false	Whether to serialize shallowly.

Returns undefined | Shape<T>

Shape of the *Model* or undefined.

Inherited from Required.serialize

Defined in packages/data/src/model/model.ts:721

Model.Type.treemap

treemap

► **treemap**<T>(this, model, shallow?): undefined | Graph<T>

Static **treemap** method. Calling this method on a class extending the abstract *Model* base class, while supplying a model which to **treemap** and optionally enabling shallow **treemapping**, will return a Graph describing the fields which are declared and defined on the supplied model, or undefined, if the supplied model does not contain any fields or values. By **treemapping** shallowly, only properties defined on the supplied model are included (which means, all one-to-one and one-to-many associations are ignored). Through this method, the Graph for one specific *Model* instance from the respective *Model* repository can be retrieved.

Example

Treemap a *Model*:

```
import { ExampleModel } from './example-model';

const model = new ExampleModel({ field: 'example' });
const graph = ExampleModel.treemap(model);
console.log(graph); // ['field']
```

Type parameters

Name	Type	Description
T	extends <i>Model</i> <any, T>	Extending <i>Model</i> instance type.

Parameters

Name	Type	Default value	Description
this	Type<T>	undefined	Static polymorphic this.
model	T	undefined	<i>Model</i> which is to be treemapped .

Name	Type	Default value	Description
shallow	boolean	false	Whether to treemap shallowly.

Returns undefined | Graph<T>

Graph of the *Model* or undefined.

Inherited from Required.treemap

Defined in packages/data/src/model/model.ts:792

Model.Type.unwrap

unwrap

► **unwrap**<T>(this, graph): string

Static **unwrap** method. Calling this method on a class extending the abstract *Model* base class, while supplying a graph describing the fields which to **unwrap**, will return the **unwrapped** Graph as raw string. Through this method, the Graph for one specific *Model* instance from the respective *Model* repository can be **unwrapped** into a raw string. This **unwrapped** Graph can then be consumed by, e.g., the *commit* method.

Example

Unwrap a Graph:

```
import { ExampleModel } from './example-model';

const unwrapped = ExampleModel.unwrap([
  'id',
  'modified',
  'field'
]);

console.log(unwrapped); // '{id modified field}'
```

Type parameters

Name	Type	Description
T	extends Model<any, T>	Extending <i>Model</i> instance type.

Parameters

Name	Type	Description
this graph	Type<T> Graph<T>	Static polymorphic this. Graph which is to be unwrapped .

Returns string

Unwrapped Graph as raw string.

Inherited from Required.unwrap

Defined in packages/data/src/model/model.ts:859

Model.Type.value

valuate

► **valuate**<T>(this, model, field): any

Static **valuate** method. Calling this method on a class extending the abstract *Model* base class, while supplying a model and a field which to **valuate**, will return the preprocessed value (e.g., primitive representation of JavaScript Dates) of the supplied field of the supplied model. Through this method, the preprocessed field value of one specific *Model* instance from the respective *Model* repository can be retrieved.

Example

Valuate a field:

```
import { ExampleModel } from './example-model';

const model = new ExampleModel({ created: new Date(0) });
const value = ExampleModel.valuate(model, 'created');
console.log(value); // '1970-01-01T00:00:00.000+00:00'
```

Type parameters

Name	Type	Description
T	extends Model<any, T>	Extending <i>Model</i> instance type.

Parameters

Name	Type	Description
this	Type<T>	Static polymorphic this.
model	T	<i>Model</i> which is to be valuated .
field	Field<T>	Field of the <i>Model</i> to be valuated .

Returns

any

Valuated field value.

Inherited from

Required.valuate

Defined in

packages/data/src/model/model.ts:931

data.Property

Property

T **Property**: Type<any> | typeof Boolean | typeof Date | typeof Number | typeof String

Type alias for a union type of all primitive constructors which may be used as typeFactory argument for the Property decorator.

See

Property

Defined in

packages/data/src/relation/property.ts:70

packages/data/src/relation/property.ts:12

data.Property

Property

► **Property**<T>(typeFactory, transient?): <M>(model: M, field: Field<M>) => void

Model field decorator factory. Using this decorator, Models can be enriched with primitive fields. The compatible primitives are the subset of primitives JavaScript shares with JSON, i.e., *Boolean*, *Date* (serialized), *Number* and *String*. *Objects* cannot be used as a typeFactory argument value, as Model fields containing objects should be declared by the HasOne and HasMany Model field decorators. By employing this decorator, the decorated field will (depending on the transient argument value) be taken into account when serializing or treemapping the Model containing the decorated field.

Example

Model with a primitive field:

```
import { Model, Property } from '@sgrud/data';

export class ExampleModel extends Model<ExampleModel> {

  @Property(() => String)
  public field?: string;

  protected [Symbol.toStringTag]: string = 'ExampleModel';
}
```

See

- Model
- HasOne
- HasMany

Type parameters

Name	Type	Description
T	extends Property	Field value constructor type.

Parameters

Name	Type	Default value	Description
typeFactory	() => T	undefined	Forward reference to the field value constructor.
transient	boolean	false	Whether the decorated field is transient.

Returns

fn

Model field decorator.

► <M>(model, field): void

Type parameters

Name	Type
M	extends Model<any, M>

Parameters

Name	Type
model	M
field	Field<M>

Returns void

Defined in packages/data/src/relation/property.ts:70

data.Querier

Querier

• Abstract **Querier**: Object

Abstract **Querier** base class to implement Model data queriers. By extending this abstract base class and providing the extending class to the Linker, e.g., by Targeting it, the respective classes *priority* method will be called whenever the Model *commits* data and, if this class claims the highest priority, its *commit* method will be called.

Decorator

Provide

Example

Simple **Querier** stub:

```
import type { Model, Querier } from '@sgrud/data';
import type { Observable } from 'rxjs';
import { Provider, Target } from '@sgrud/core';

@Target<typeof ExampleQuerier>()
export class ExampleQuerier
  extends Provider<typeof Querier>('sgrud.data.querier.Querier') {

  public override readonly types: Set<Querier.Type> = new Set<Querier.Type>([
    'query'
  ]);

  public override commit(
    operation: Querier.Operation,
    variables: Querier.Variables
  ): Observable<any> {
    throw new Error('Stub!');
  }

  public override priority(model: Model.Type<any>): number {
    return 0;
  }
}
```

See

Model

Defined in packages/data/src/querier/querier.ts:15

packages/data/src/querier/querier.ts:96

data.Querier.provide

provide

■ Static Readonly **provide**: "sgrud.data.querier.Querier"

Magic string by which this class is provided.

See

provide

Defined in packages/data/src/querier/querier.ts:105

data.Querier.commit

commit

► Abstract **commit**(operation, variables?): Observable<any>

The overridden **commit** method of Targeted queriers is called by the Model to **commit** operations. The invocation arguments are the operation, unraveled into a string, and all variables embedded within this operation. The extending class has to serialize the Variables and transfer the operation. It's the callers responsibility to unravel the Operation prior to invoking this method, and to deserialize and (error) handle whatever response is received.

Parameters

Name	Type	Description
operation	'mutation \${string}' 'query \${string}' 'subscription \${string}'	Querier Operation to be committed.
variables?	Variables	Variables within the Operation.

Returns Observable<any>

Observable of the committed Operation.

Defined in packages/data/src/querier/querier.ts:135

data.Querier.constructor

constructor

• **new Querier()**

data.Querier.priority

priority

► Abstract **priority**(model): number

Whenever the *commit* method of the Model is invoked, all Targeted and compatible queriers, i.e., implementations of the this class capable of handling the specific Type of the to be committed Operation, will be asked to prioritize themselves regarding the respective Model. The querier claiming the highest **priority** will be chosen and its *commit* method called.

Parameters

Name	Type	Description
model	Type<any>	Model to be committed.

Returns number

Priority of this implementation.

Defined in packages/data/src/querier/querier.ts:156

data.Querier.types

types

- Readonly Abstract **types**: Set<Type>

A set containing all Types of queries this class can handle. May contain none to all of 'mutation', 'query' and 'subscription'.

Defined in packages/data/src/querier/querier.ts:114

data.Querier

Querier

- **Querier**: Object

Namespace containing types and interfaces used and intended to be used in conjunction with the abstract Querier base class and in context of the Model data handling.

See

Querier

Defined in packages/data/src/querier/querier.ts:15

packages/data/src/querier/querier.ts:96

data.Querier.Operation

Operation

T Operation: `\${Type} \${string}`

String literal helper type. Enforces any assigned string to conform to the standard form of an operation: A string, starting with the Type, followed by one whitespace and the operation content.

Defined in packages/data/src/querier/querier.ts:35

data.Querier.Type

Type

T Type: "mutation" | "query" | "subscription"

Type alias for a string union type of all known Operation types: 'mutation', 'query' and 'subscription'.

Defined in packages/data/src/querier/querier.ts:23

data.Querier.Variables

Variables

- **Variables**: Object

Interface describing the shape of variables which may be embedded within Operations. Variables are a simple key-value map, which can be deeply nested.

Defined in packages/data/src/querier/querier.ts:44

data.enumerate

enumerate

► **enumerate**<T>(enumerator): T

Enumerate helper function. Enumerations are special objects and all used TypeScript enums have to be looped through this helper function before they can be utilized in conjunction with the Model.

Example

Enumerate a TypeScript enumeration:

```
import { enumerate } from '@sgrud/data';

enum Enumeration {
  One = 'ONE',
  Two = 'TWO'
}

export type ExampleEnum = Enumeration;
export const ExampleEnum = enumerate(Enumeration);
```

See

Model

Type parameters

Name	Type	Description
T	extends object	Enumeration type.

Parameters

Name	Type	Description
enumerator	T	TypeScript enumeration.

Returns

T

Processed enumeration.

Defined in packages/data/src/model/enum.ts:55

data.hasMany

hasMany

- Const **hasMany**: typeof hasMany

Unique symbol used as property key by the HasMany decorator to register decorated Model fields for further computation, e.g., serialization, treemapping etc.

See

HasMany

Defined in packages/data/src/relation/has-many.ts:14

data.hasOne

hasOne

- Const **hasOne**: typeof hasOne

Unique symbol used as property key by the HasOne decorator to register decorated Model fields for further computation, e.g., serialization, treemapping etc.

See

HasOne

Defined in packages/data/src/relation/has-one.ts:14

data.property

property

- Const **property**: typeof property

Unique symbol used as property key by the Property decorator to register decorated Model fields for further computation, e.g., serialization, treemapping etc.

See

Property

Defined in packages/data/src/relation/property.ts:29

Module: shell

shell

- **shell**: Object

@sgrud/shell - The SGRUD Web UI Shell.

The functions and classes found within this module are intended to ease the implementation of Component-based frontends by providing JSX runtime bindings for the incremental-dom library and a Router targeted at routing through Components based upon the SGRUD client libraries, but not limited to those. Furthermore, complex routing strategies and actions may be implemented through the interceptor-like RouterTask pattern.

Defined in packages/shell/index.ts:21

shell.Attribute

Attribute

- **Attribute**(name?): (prototype: Component, propertyKey: PropertyKey) => void

Component prototype property decorator factory. Applying the **Attribute** decorator to a property of a Component binds the decorated property to the corresponding attribute of the respective Component. This implies that the attribute name is added to the *observedAttributes* array of the Component and the decorated property is replaced with a getter and setter deferring those operations to the attribute. If no name supplied, the name of the decorated property will be used instead. Further, if both, a parameter initializer and an initial attribute value are supplied, the attribute value takes precedence.

Example

Decorate a property:

```
import { Attribute, Component } from '@sgrud/shell';

declare global {
  interface HTMLElementTagNameMap {
    'example-component': ExampleComponent;
  }
}
```

```

}

@Component('example-component')
export class ExampleComponent extends HTMLElement implements Component {

  @Attribute()
  public field?: string;

  public get template(): JSX.Element {
    return <span>Attribute value: {this.field}</span>;
  }
}

```

See

Component

Parameters

Name	Type	Description
name?	string	Component attribute name.

Returns fn

Component prototype property decorator.

► (prototype, propertyKey): void

Parameters

Name	Type
prototype	Component
propertyKey	PropertyKey

Returns void

Defined in `packages/shell/src/component/attribute.ts:46`

shell.Component

Component

► **Component**<S, R>(selector, inherits?): <T>(constructor: T) => T

Class decorator factory. Registers the decorated class as **Component** through the customElements registry. Registered **Components** can be used in conjunction with the Attribute and Reference prototype property decorators which will trigger the **Component** to re-render, when one of the *observedAttributes* or *observedReferences* changes. While any **Component** which is registered by this decorator is enriched with basic rendering functionality, any implemented method will cancel out its super logic.

Example

Register a component:

```

import { Component } from '@sgrud/shell';

declare global {
  interface HTMLElementTagNameMap {
    'example-component': ExampleComponent;
  }
}

@Component('example-component')
export class ExampleComponent extends HTMLElement implements Component {

```

```

    public readonly styles: string[] = [
      span {
        font-style: italic;
      }
    ];

    public get template(): JSX.Element {
      return <span>Example component</span>;
    }
  }
}

```

See

- [Attribute](#)
- [Reference](#)

Type parameters

Name	Type	Description
S	extends CustomElementTagName	Component tag type.
R	extends HTMLElementTagName	-

Parameters

Name	Type	Description
selector	S	Component tag name.
inherits?	R	Extended tag name.

Returns

fn

Class decorator.

► <T>(constructor): T

Type parameters

Name	Type
T	extends () => Component & HTMLElementTagNameMap[S] & HTMLElementTagNameMap[R]

Parameters

Name	Type
constructor	T

Returns

T

Defined in `packages/shell/src/component/component.ts:157`

shell.Component

Component

- **Component:** Object

Interface describing the shape of a **Component**. Mostly adheres to the WebComponents specification while providing rendering and change detection capabilities.

Defined in packages/shell/src/component/component.ts:157
packages/shell/src/component/component.ts:19

shell.Component.adoptedCallback

adoptedCallback

► Optional **adoptedCallback()**: void
Called when the *Component* is moved between documents.

Returns void

Defined in packages/shell/src/component/component.ts:61

shell.Component.attributeChangedCallback

attributeChangedCallback

► Optional **attributeChangedCallback**(name, prev?, next?): void
Called when one of the *Component*'s observed Attributes is added, removed or changed. Which *Component* attributes are observed depends on the contents of the *observedAttributes* array.

Parameters

Name	Type	Description
name	string	Attribute name.
prev?	string	Previous value.
next?	string	Next value.

Returns void

Defined in packages/shell/src/component/component.ts:74

shell.Component.connectedCallback

connectedCallback

► Optional **connectedCallback()**: void
Called when the *Component* is appended to or moved within the dom.

Returns void

Defined in packages/shell/src/component/component.ts:79

shell.Component.constructor

constructor

• **constructor**: Object

Inherited from HTMLElement.constructor

shell.Component.disconnectedCallback

disconnectedCallback

► Optional **disconnectedCallback**(): void

Called when the *Component* is removed from the dom.

Returns void

Defined in packages/shell/src/component/component.ts:84

shell.Component.observedAttributes

observedAttributes

• Optional Readonly **observedAttributes**: string[]

Array of Attribute names, which should be observed for changes, which will trigger the *attributeChangedCallback*.

Defined in packages/shell/src/component/component.ts:27

shell.Component.observedReferences

observedReferences

• Optional Readonly **observedReferences**: Record<Key, keyof HTMLElementEventMap[]>

Mapping of References to observed events, which, when emitted by the referenced node, trigger the *referenceChangedCallback*.

Defined in packages/shell/src/component/component.ts:35

shell.Component.readyState

readyState

• Optional Readonly **readyState**: boolean

Internal readiness indication. Initially resolves to undefined and will mirror the *isConnected* state, when ready.

Defined in packages/shell/src/component/component.ts:41

shell.Component.referenceChangedCallback

referenceChangedCallback

► Optional **referenceChangedCallback**(name, node, event): void

Called when one of the *Component*'s Referenced and observed nodes emits an event. Which Referenced nodes are observed for which events depends on the contents of the *observedReferences* mapping.

Parameters

Name	Type	Description
name	string	Reference name.
node	Node	-
event	Event	Emitted event.

Returns void

Defined in packages/shell/src/component/component.ts:96

shell.Component.renderComponent

renderComponent

► Optional **renderComponent**(): void

Called when the *Component* has changed and should be (re-)rendered.

Returns void

Defined in packages/shell/src/component/component.ts:103

shell.Component.styles

styles

• Optional Readonly **styles**: string[]

Array of CSS **styles** in string form, which should be included within the shadow dom of the *Component*.

Defined in packages/shell/src/component/component.ts:47

shell.Component.template

template

• Optional Readonly **template**: Element

JSX representation of the *Component* **template**. If no template is supplied, an HTMLSlotElement will be rendered instead.

Defined in packages/shell/src/component/component.ts:56

shell.CustomElementTagName

CustomElementTagName

T **CustomElementTagName**: Extract<keyof HTMLElementTagNameMap, `\${string}-\${string}`>

Global string literal helper type. Enforces any assigned string to be a keyof HTMLElementTagNameMap, while excluding built-in tag names, i.e., extracting all `\${string}-\${string}` keys of HTMLElementTagNameMap.

Example

A valid **CustomElementTagName**:

```
const tagName: CustomElementTagName = 'example-component';
```

Defined in packages/shell/src/component/runtime.ts:17

shell.HTMLElementTagName

HTMLElementTagName

T HTMLElementTagName: Exclude<keyof HTMLElementTagNameMap, `\${string}-\${string}`>

Global string literal helper type. Enforces any assigned string to be a keyof HTMLElementTagNameMap, while excluding custom element tag names, i.e., all `\${string}-\${string}` keys of HTMLElementTagNameMap.

Example

A valid **HTMLElementTagName**:

```
const tagName: HTMLElementTagName = 'div';
```

Defined in packages/shell/src/component/runtime.ts:31

shell.JSX

JSX

• **JSX:** Object

Intrinsic JSX namespace.

Defined in packages/shell/src/component/runtime.ts:39

shell.JSX.Element

Element

T Element: () => Node[]

Intrinsic JSX **element** type helper representing an array of bound incremental-dom calls.

Defined in packages/shell/src/component/runtime.ts:48

shell.JSX.IntrinsicElements

IntrinsicElements

T IntrinsicElements: { [K in keyof HTMLElementTagNameMap]: Partial<HTMLElementTagNameMap[K]> & Object }

Intrinsic list of known JSX elements, comprised of the global HTMLElementTagNameMap.

Defined in packages/shell/src/component/runtime.ts:56

shell.JSX.Key

Key

T Key: string | number

Element reference **Key** type helper. Enforces any assigned value to be a incremental-dom-compatible **Key** type.

Defined in packages/shell/src/component/runtime.ts:80

shell.Reference

Reference

► **Reference**(reference, observe?): (prototype: Component, propertyKey: PropertyKey) => void

Component prototype property decorator factory. Applying the **Reference** decorator to a property of a registered Component while supplying the reference key and, optionally, an array of events to observe, will replace the decorated property with a getter returning the referenced node, once rendered. If an array of events is supplied, whenever one of those events is emitted by the referenced node, the *referenceChangedCallback* of the respective Component is called with the reference key, the referenced node and the emitted event.

Example

Reference a node:

```
import { Component, Reference } from '@sgrud/shell';

declare global {
  interface HTMLElementTagNameMap {
    'example-component': ExampleComponent;
  }
}

@Component('example-component')
export class ExampleComponent extends HTMLElement implements Component {

  @Reference('example-key')
  private readonly span?: HTMLSpanElement;

  public get template(): JSX.Element {
    return <span key="example-key"></span>;
  }
}
```

See

Component

Parameters

Name	Type	Description
reference	Key	Element reference.
observe?	keyof HTMLElementEventMap[]	Events to observe.

Returns fn

Component prototype property decorator.

► (prototype, propertyKey): void

Parameters

Name	Type
prototype	Component
propertyKey	PropertyKey

Returns void

Defined in packages/shell/src/component/reference.ts:49

shell.Route

Route

► **Route**<S>(config): <T>(constructor: T) => void

Class decorator factory. Applying the **Route** decorator to a custom element will associate the supplied Route config to the decorated element constructor. Further, the configured children are iterated and every child that is a custom element itself will be replaced by its respective Route. Finally, the processed config for the decorated element is associated to the element constructor and added to the Router.

Example

Associate a Route config to a element:

```
import { Component, Route } from '@sgrud/shell';
import { ChildComponent } from './child-component';

@Route({
  path: 'example',
  children: [
    ChildComponent
  ]
})
@Component('example-element')
export class ExampleComponent extends HTMLElement implements Component { }
```

See

Router

Type parameters

Name	Type	Description
S	extends string	Route path string type.

Parameters

Name	Type	Description
config	Assign<{ children?: (Route<string> CustomElementConstructor & { [route]?: Route<string> })[]; slots?: Record<string, CustomElementConstructor CustomElementTagName> }, Omit<Route<S>, "component">> & { parent?: Route<string> CustomElementConstructor & { [route]?: Route<string> } }>	Route config for this element.

Returns

 fn

Class decorator.

► <T>(constructor): void

Type parameters

Name	Type
T	extends CustomElementConstructor & { [route]?: Route<S> }

Parameters

Name	Type
constructor	T

Returns void

Defined in packages/shell/src/router/route.ts:99

shell.Route

Route

• **Route**<S>: Object

Interface describing the shape of a **Route**. A **Route** must consist of at least a *path* and may declare a *component*, which will be rendered when the **Route** is navigated to, as well as *slots* and elements which will be slotted within those. Furthermore a **Route** may also specify *children*.

Example

Define a **Route**:

```
import type { Route } from '@sgrud/shell';

const route: Route = {
  path: '',
  component: 'example-element',
  children: [
    {
      path: 'child',
      component: 'child-element'
    }
  ]
};
```

See

Router

Type parameters

Name	Type	Description
S	extends string = string	Route path string type.

Defined in packages/shell/src/router/route.ts:99

packages/shell/src/router/route.ts:34

shell.Route.children

children

• Optional Readonly **children**: Route<string>[]

Optional array of **children** for this route.

Defined in packages/shell/src/router/route.ts:39

shell.Route.component

component

- Optional Readonly **component**: CustomElementTagName

Optional route **component**.

Defined in packages/shell/src/router/route.ts:44

shell.Route.constructor

constructor

- **constructor**: Object

shell.Route.path

path

- Readonly **path**: S

Required route **path**.

Defined in packages/shell/src/router/route.ts:49

shell.Route.slots

slots

- Optional Readonly **slots**: Record<string, CustomElementTagName>

Optional mapping of **slots** to their elements.

Defined in packages/shell/src/router/route.ts:54

shell.Router

Router

- **Router**: Object

Targeted Singleton Router class extending the built-in *Set*. This Singleton class provides routing and rendering capabilities. Routing is primarily realized by maintaining (inheriting) a *Set* of Routes and (recursively) *matching* paths against those Routes, when instructed so by calling *navigate*. When a matching Segment is found, the corresponding Components are rendered by the *handle* method (which is part of the implemented Task contract).

Decorator

Target

Decorator

Singleton

Defined in packages/shell/src/router/router.ts:16

packages/shell/src/router/router.ts:192

shell.Router.observable

observable

- Readonly **observable**: () => Subscribable<State<string>>>

Type declaration **►** (): `Subscribable<State<string>>`

Symbol property typed as callback to a `Subscribable`. The returned `Subscribable` emits the current `State` and every time this *changes*.

Example

Subscribe to the *Router*:

```
import { Router } from '@sgrud/shell';
import { from } from 'rxjs';

from(new Router()).subscribe(console.log);
```

Returns `Subscribable<State<string>>`

Callback to a `Subscribable`.

Defined in `packages/shell/src/router/router.ts:212`

`shell.Router.add`

add

► add(route): `Router`

Overridden **add** method. Invoking this method while supplying a route will **add** the supplied route to the *Router* after deleting its child *Routers* from the *Router*, thereby ensuring that only top-most/root routes remain part of the *Router*.

Parameters

Name	Type	Description
route	<code>Route<string></code>	Route to add .

Returns `Router`

This instance.

Overrides `Set.add`

Defined in `packages/shell/src/router/router.ts:298`

`shell.Router.baseHref`

baseHref

• Readonly **baseHref**: `string`

Absolute **baseHref** for navigation.

Defined in `packages/shell/src/router/router.ts:217`

`shell.Router.bind`

bind

► **bind**(this, outlet?, baseHref?, hashBased?): void

Binding helper method. Calling this method will **bind** a handler to the global onpopstate event, invoking *navigate* with the appropriate arguments. This method furthermore allows the properties *baseHref*, *hashBased* and *outlet* to be overridden. Invoking the **bind** method throws an error if called more than once, without invoking the *unbind* method in between.

Throws

ReferenceError.

Parameters

Name	Type	Description
this outlet	Mutable<Router> Element DocumentFragment	Mutable polymorphic this. Rendering outlet for navigated Routes.
baseHref	string	Absolute baseHref for navigation.
hashBased	boolean	Wether to employ hashBased routing.

Returns

void

Defined in packages/shell/src/router/router.ts:324

shell.Router.constructor

constructor

• **new Router()**

Singleton *Router* class **constructor**. This **constructor** is called once by the Target decorator and sets initial values on the instance. All subsequent calls will return the previously constructed Singleton instance of this class.

Overrides Set<Route>.constructor

Defined in packages/shell/src/router/router.ts:268

shell.Router.handle

handle

► **handle**(state, replace?): Observable<State<string>>

Implementation of the **handle** method as required by the Task interface contract. This method is called internally by the *match* method after all RouterTasks have been invoked. It is therefore considered the default or fallback RouterTask and handles the rendering of the supplied state.

Parameters

Name	Type	Default value	Description
state replace	State<string> boolean	undefined false	<i>Router</i> State to handle. Wether to replace the State.

Returns Observable<State<string>>

Observable of the handled State.

Implementation of Task.handle

Defined in packages/shell/src/router/router.ts:365

shell.Router.hashBased

hashBased

• Readonly **hashBased**: boolean

Wether to employ **hashBased** routing.

Defined in packages/shell/src/router/router.ts:222

shell.Router.join

join

► **join**(segment): string

Segment **joining** helper. The supplied segment is converted to a string by *pooling* to its top-most parent and iterating through all children while concatenating every encountered path. If said path is an (optional) parameter, this portion of the returned string is replaced by the respective Params value.

Parameters

Name	Type	Description
segment	Segment<string>	Segment to be joined .

Returns string

Joined Segment as string.

Defined in packages/shell/src/router/router.ts:413

shell.Router.match

match

► **match**(path, routes?): undefined | Segment<string>

Main *Router* **matching** method. Calling this method while supplying a path and optionally an array of routes will return a **matching** Segment or undefined, if no match was found. If no routes are supplied, routes previously added to the *Router* will be used. The **match** method represents the backbone of the *Router* class, as it, given a list of routes and a path, will determine wether this path represents a **match** within the list of routes, thereby effectively determining navigational integrity.

Example

Test if path 'example/route' **matches** child or route:

```
import { Router } from '@sgrud/shell';

const path = 'example/route';
const router = new Router();

const child = {
  path: 'route'
};

const route = {
  path: 'example',
  children: [child]
```

```
};

router.match(path, [child]); // false
router.match(path, [route]); // true
```

Parameters

Name	Type	Description
path	string	Path to match against.
routes	Route<string>[]	Routes to use for matching .

Returns undefined | Segment<string>

Matching Segment or undefined.

Defined in packages/shell/src/router/router.ts:475

shell.Router.navigate

navigate

► **navigate**(target, search?, replace?): Observable<State<string>>

Main navigation method. Calling this method while supplying either a path or Segment as navigation target (and optional search parameters) will normalize the path by trying to *match* a respective Segment or directly use the supplied Segment as next State. This upcoming State is looped through all linked RouterTasks and finally *handled* by the *Router* itself to render the resulting, possibly intercepted and mutated State.

Throws

Observable if URIError.

Parameters

Name	Type	Default value	Description
target	string Segment<string>	undefined	Path or Segment to navigate to.
search?	string	undefined	Optional search parameters.
replace	boolean	false	Whether to replace the State.

Returns Observable<State<string>>

Observable of the *Router* State.

Defined in packages/shell/src/router/router.ts:574

shell.Router.outlet

outlet

• Readonly **outlet**: Element | DocumentFragment

Rendering **outlet** for navigated Routes.

Defined in packages/shell/src/router/router.ts:229

shell.Router.rebase

rebase

► **rebase**(path, prefix?): string

Rebasing helper method. **Rebases** the supplied path against the current *baseHref*, by either prepending the *baseHref* to the supplied path or stripping it, depending on the prefix argument.

Parameters

Name	Type	Default value	Description
path	string	undefined	Path to rebase against the <i>baseHref</i> .
prefix	boolean	true	Whether to prepend or strip the <i>baseHref</i> .

Returns string

Rebased path.

Defined in packages/shell/src/router/router.ts:631

shell.Router.spool

spool

► **spool**(segment, rewind?): Segment<string>

Spooling helper method. Given a segment (and whether to rewind), the top-most parent (or deepest child) of the graph-link Segment is returned.

Parameters

Name	Type	Default value	Description
segment	Segment<string>	undefined	Segment to spool .
rewind	boolean	true	Spool direction.

Returns Segment<string>

Spooled Segment.

Defined in packages/shell/src/router/router.ts:658

shell.Router.state

state

• get **state**(): State<string>

Getter mirroring the current value of the *changes* BehaviorSubject.

Returns State<string>

Defined in packages/shell/src/router/router.ts:255

shell.Router.unbind

unbind

► **unbind**(this): void

Unbinding helper method. Calling this method (after calling *bind*) will **unbind** the previously bound handler from the global onpopstate event. Further, the arguments passed to *bind* are revoked, meaning the default values of the properties *baseHref*, *hashBased* and *outlet* are restored. Calling this method without previously *binding* the *Router* will throw an error.

Throws

ReferenceError.

Parameters

Name	Type	Description
this	Mutable<Router>	Mutable polymorphic this.

Returns

 void

Defined in packages/shell/src/router/router.ts:686

shell.Router.changes

changes

• Private Readonly **changes**: BehaviorSubject<State<string>>

Internally used BehaviorSubject containing and emitting every navigated State.

Defined in packages/shell/src/router/router.ts:238

shell.Router

Router

• **Router**: Object

Namespace containing types and interfaces used and intended to be used in conjunction with the Singleton Router class.

See

Router

Defined in packages/shell/src/router/router.ts:16

packages/shell/src/router/router.ts:192

shell.Router.Left

Left

T **Left**<S>: S extends `\${infer I}/\${string}` ? I : S

String literal helper type. Represents the **left** part of a path.

Example

Left of 'nested/route/path':

```
import type { Router } from '@sgrud/shell';
```

```
const left: Router.Left<'nested/route/path'>; // 'nested'
```

Type parameters

Name	Type	Description
S	extends string	Route path string type.

Defined in packages/shell/src/router/router.ts:31

shell.Router.Params

Params

T **Params**<S>: S extends `\${string}:\${infer P}`? P extends `\${Left<P>}\${infer R}`? Params<R> : never & Left<P> extends `\${infer O}?`? { [K in O]?: string } : { [K in Left<P>]: string } : {}

Type helper representing the (optional) **Params** of a Route path. By extracting string literals starting with a colon (and optionally ending on a question mark), a union type of a key/value pair for each parameter is created.

Example

Extract parameters from 'item/:id/field/:name?':

```
import type { Router } from '@sgrud/shell';

const params: Router.Params<'item/:id/field/:name?'>;
// { id: string; name?: string; }
```

Type parameters

Name	Description
S	Route path string type.

Defined in packages/shell/src/router/router.ts:52

shell.Router.Segment

Segment

• **Segment**<S>: Object

Interface describing the shape of a Router **Segment**. A **Segment** represents a navigated Route and its corresponding Params. As Routes are represented in a tree-like structure and one **Segment** represents one layer within the Route-tree, each **Segment** may have a *parent* and/or a *child*. The resulting graph of **Segments** represents the navigated path through the underlying Route-tree.

Type parameters

Name	Type	Description
S	extends string = string	Route path string type.

Defined in packages/shell/src/router/router.ts:76

Router.Segment.child

child

• Optional Readonly **child**: Segment<string>

Optional **child** of this *Segment*.

Defined in packages/shell/src/router/router.ts:81

Router.Segment.params

params

- Readonly **params**: Params<S>

Route path Params and corresponding values.

Defined in packages/shell/src/router/router.ts:89

Router.Segment.parent

parent

- Optional Readonly **parent**: Segment<string>

Optional **parent** of this *Segment*.

Defined in packages/shell/src/router/router.ts:94

Router.Segment.route

route

- Readonly **route**: Route<S>

Route associated to this *Segment*.

Defined in packages/shell/src/router/router.ts:101

shell.Router.State

State

- **State**<S>: Object

Interface describing the shape of a Router **State**. Router **States** correspond to the browser history, as each navigation results in a new **State** being created. Each navigated **State** is represented by its absolute *path*, a Segment as entrypoint to the graph-like representation of the navigated path through the route-tree and *search* parameters.

Type parameters

Name	Type	Description
S	extends string = string	Route path string type.

Defined in packages/shell/src/router/router.ts:118

Router.State.path

path

- Readonly **path**: S

Absolute **path** of the Router *State*.

Defined in packages/shell/src/router/router.ts:125

Router.State.search

search

- Readonly **search**: string

Search parameters of the Router *State*.

Defined in packages/shell/src/router/router.ts:132

Router.State.segment

segment

- Readonly **segment**: Segment<S>

Segment of the Router *State*.

Defined in packages/shell/src/router/router.ts:140

shell.Router.Task

Task

- **Task**: Object

Interface describing the shape of a RouterTask. These **Tasks** are run whenever a navigation is triggered and may intercept and mutate the next State or completely block or redirect a navigation.

See

RouterTask

Defined in packages/shell/src/router/router.ts:154

Router.Task.handle

handle

- **handle**(next): Observable<State<string>>

Method called when a navigation was triggered.

Parameters

Name	Type	Description
next	State<string>	Next State to be handled.

Returns Observable<State<string>>

Observable of handled State.

Defined in packages/shell/src/router/router.ts:165

shell.RouterLink

RouterLink

• **RouterLink**: Object

Custom element extending the HTMLAnchorElement. This element provides a declarative way to invoke the Router, while maintaining compatibility with SSR/SEO aspects of SPAs. This is achieved by rewriting absolute *hrefs* to be contained within the applications base href and intercepting the default browser behavior when *onclicked*.

Example

A router-link:

```
<a href="/example" is="router-link">Example</a>
```

See

Router

Defined in packages/shell/src/router/link.ts:36

shell.RouterLink.observedAttributes

observedAttributes

■ Static Readonly **observedAttributes**: string[]

Array of attribute names, which should be observed for changes, which will trigger the *attributeChangedCallback*. This element only observes the href attribute.

Defined in packages/shell/src/router/link.ts:43

shell.RouterLink.attributeChangedCallback

attributeChangedCallback

► **attributeChangedCallback**(_name, _prev?, next?): void

This method id called whenever the element’s href attribute is added, removed or changed. The next attribute value is used to determine wether to rewrite the href by letting the Router *rebase* it.

Parameters

Name	Type	Description
_name	string	Attribute name (ignored).
_prev?	string	Previous value (ignored).
next?	string	Next value.

Returns void

Defined in packages/shell/src/router/link.ts:83

shell.RouterLink.constructor

constructor

• **new RouterLink()**

Public **constructor** of this custom element. This **constructor** is called whenever an instance this custom element is rendered.

Overrides HTMLAnchorElement.constructor

Defined in packages/shell/src/router/link.ts:62

shell.RouterLink.onclick

onclick

• **onclick**: (event: MouseEvent) => void

Type declaration ▶ (event): void

Overridden **onclick** handler, preventing the default browser behavior and letting the Router handle the navigation instead.

Parameters

Name	Type	Description
event	MouseEvent	Mouse click event.

Returns void

Overrides HTMLAnchorElement.onclick

Defined in packages/shell/src/router/link.ts:102

shell.RouterLink.router

router

• Private Readonly **router**: Router

Factored-in **router** property retrieving the linked Router.

Decorator

Factor

Defined in packages/shell/src/router/link.ts:56

shell.RouterOutlet

RouterOutlet

• **RouterOutlet**: Object

Custom element extending the HTMLSlotElement. When this element is constructed, it supplies the value of its *baseHref* attribute and the presence of a *hashBased* attribute on itself to the Router while *binding* the Router to itself. This element should only be used once, as it will be used by the Router as *outlet* to render the current State.

Example

A router-outlet:

```
<slot baseHref="/example" is="router-outlet">Loading...</slot>
```

See

Router

Defined in packages/shell/src/router/outlet.ts:38

shell.RouterOutlet.baseHref

baseHref

• get **baseHref**(): undefined | string

Getter mirroring the **baseHref** attribute of the element.

Returns undefined | string

Defined in packages/shell/src/router/outlet.ts:43

shell.RouterOutlet.constructor

constructor

• new **RouterOutlet**()

Custom element **constructor**. Supplies the value of its *baseHref* attribute and the presence of a *hash-Based* attribute on itself to the Router while *binding* the Router to itself. It furthermore invokes a *setTimeout* loop, running until the number of routes the router contains evaluates truthy, which in turn triggers an initial navigation.

Overrides HTMLSlotElement.constructor

Defined in packages/shell/src/router/outlet.ts:63

shell.RouterOutlet.hashBased

hashBased

• get **hashBased**(): boolean

Getter mirroring the presence of a **hashBased** attribute on the element.

Returns boolean

Defined in packages/shell/src/router/outlet.ts:50

shell.RouterTask

RouterTask

• Abstract **RouterTask**: Object

Abstract base class to implement **RouterTasks**. By Targeting or otherwise providing an implementation of this abstract **RouterTask** base class to the Linker, the implemented *handle* method is called whenever a new State is triggered by navigating. This interceptor-like pattern makes complex routing strategies like asynchronous module-retrieval and the similar tasks easy to be implemented.

Decorator

Provide

Example

Simple **RouterTask** stub:

```
import type { Router, RouterTask } from '@sgrud/shell';
import type { Observable } from 'rxjs';
import { Provider, Target } from '@sgrud/core';

@Target<typeof ExampleRouterTask>()
export class ExampleRouterTask
  extends Provider<typeof RouterTask>('@sgrud.shell.router.RouterTask') {

  public override handle(
    prev: Router.State,
```



```

        next: Router.State,
        handler: Router.Task
    ): Observable<Router.State> {
        throw new Error('Stub!');
    }
}

```

See

- Route
- Router

Defined in packages/shell/src/router/task.ts:48

shell.RouterTask.provide

provide

■ Static Readonly **provide**: "sgrud.shell.router.RouterTask"

Magic string by which this class is provided.

See

provide

Defined in packages/shell/src/router/task.ts:57

shell.RouterTask.constructor

constructor

- **new RouterTask()**
-

shell.RouterTask.handle

handle

► Abstract **handle**(prev, next, handler): Observable<State<string>>

Abstract **handle** method, called whenever a new State should be navigated to. This method provides the possibility to intercept these upcoming States and, e.g., mutate or redirect them.

Parameters

Name	Type	Description
prev	State<string>	Previously active router state.
next	State<string>	Next router state to be activated.
handler	Task	Next task handler.

Returns Observable<State<string>>

Next handled router state.

Defined in packages/shell/src/router/task.ts:72

shell.component

component

- Const **component**: typeof component

Unique symbol used as property key by the Component decorator to associate the supplied constructor with its wrapper.

Defined in packages/shell/src/component/component.ts:10

shell.createElement

createElement

► **createElement**(type, props?, ref?): Element

JSX element factory. Provides JSX runtime-compliant bindings to the incremental-dom library. This factory function is meant to be implicitly imported by the transpiler and returns an array of bound incremental-dom function calls, representing the created JSX element. This array of bound functions can be rendered into an element attached to the DOM through the render function.

See

render

Parameters

Name	Type	Description
type	Function keyof HTMLElementTagNameMap	Element type.
props?	Record<string, any>	Element properties.
ref?	Key	Element reference.

Returns Element

Array of bound calls.

Defined in packages/shell/src/component/runtime.ts:114

shell.createFragment

createFragment

► **createFragment**(props?): Element

JSX fragment factory. Provides a JSX runtime-compliant helper function used by the transpiler to create JSX fragments.

Parameters

Name	Type	Description
props?	Record<string, any>	Fragment properties.

Returns Element

Array of bound calls.

Defined in packages/shell/src/component/runtime.ts:179

shell.customElements

customElements

• Const **customElements**: CustomElementRegistry & { getName: (constructor: CustomElementConstructor) => undefined | string }

Proxy around the built-in customElements object, maintaining a mapping of all registered elements and their corresponding names, which can be queried by calling *getName*.

Remarks

<https://github.com/WICG/webcomponents/issues/566>

Defined in packages/shell/src/component/registry.ts:15

shell.references

references

► **references**(target): Map<Key, Node> | undefined

JSX **references** helper. Calling this function while supplying a viable target will return all referenced JSX elements mapped by their corresponding Keys known to the supplied target. A viable target may be any element, which previously was target to the render function.

Parameters

Name	Type	Description
target	Element DocumentFragment	Element to lookup references for.

Returns Map<Key, Node> | undefined

Resolved **references**.

Defined in packages/shell/src/component/runtime.ts:207

shell.render

render

► **render**(target, element): Node

JSX **rendering** helper. This helper is a wrapper around the *patch* function from the incremental-dom library and **renders** a JSX element created through createElement into an target element or fragment.

See

createElement

Parameters

Name	Type	Description
target	Element DocumentFragment	Element or fragment to render into.
element	Element	JSX element to be rendered .

Returns Node

Rendered target element.

Defined in packages/shell/src/component/runtime.ts:229

shell.route

route

- Const **route**: typeof route

Unique symbol used as property key by the Route decorator to associate the supplied route configuration to the decorated element.

Defined in packages/shell/src/router/route.ts:64

Module: state

state

- **state**: Object
-